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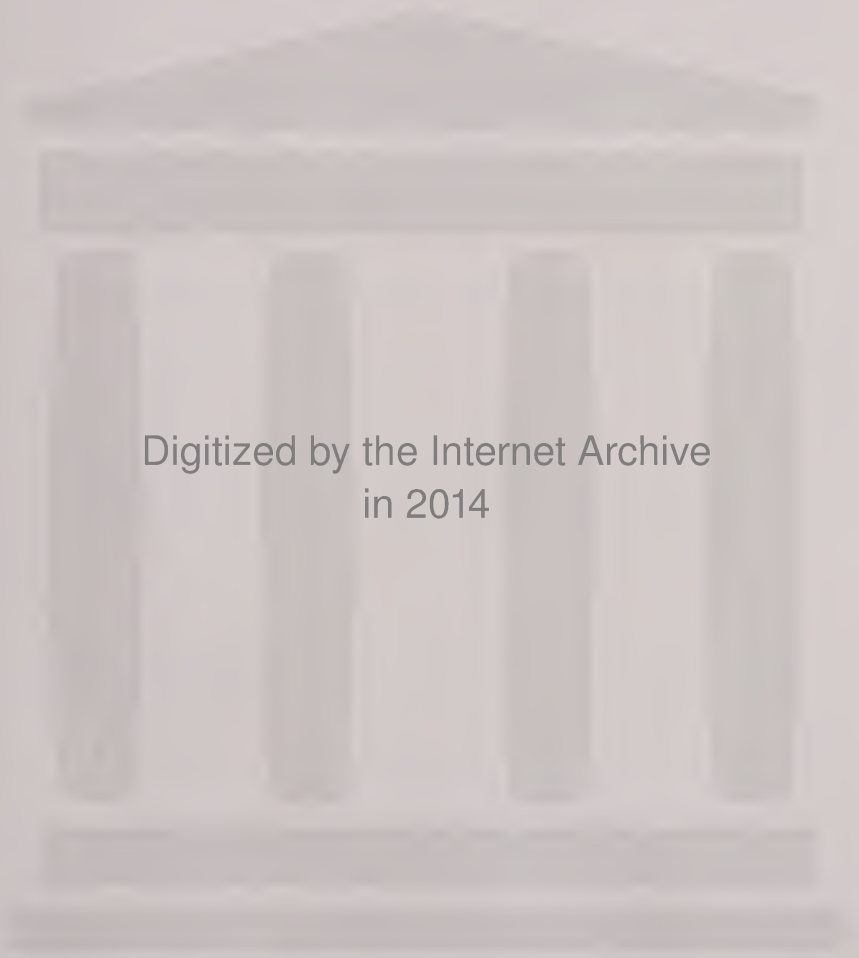

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TRANSACTIONS

OF THE

National Dental Association

AT THE

TWELFTH ANNUAL MEETING

HELD AT

Boston, Mass., July 28–31, 1908

AND OF THE

Southern Branch

AT THE

ELEVENTH ANNUAL MEETING

HELD AT

Birmingham, Ala., May 12–14, 1908

PHILADELPHIA
PRESS OF THE "DENTAL COSMOS"
The S. S. White Dental Mfg. Co.
1909

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The National Dental Association, although formally accepting and publishing the reports of the various Sections, and the Essays read before the Association, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution.—*Constitution.*

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TWELFTH ANNUAL MEETING

OF THE

National Dental Association,

HELD AT

BOSTON, MASS., JULY 28—31, 1908.

TUESDAY—First General Session.

THE first general session of the twelfth annual meeting of the National Dental Association was called to order at 10 o'clock Tuesday morning, July 28th, by the president, Dr. William Carr, New York, N. Y.

The President introduced the Rev. George A. Crawford, D.D., of Boston, who invoked the divine blessing on the deliberations of the association.

Dr. Waldo E. Boardman, Boston, chairman of the Local Committee of Arrangements, introduced the speakers of the morning.

Dr. BOARDMAN, in introducing Governor Curtis G. Guild, Jr., said:

Mr. President, ladies and gentlemen, and guests,—On August 3d, twenty-eight years ago, there met in this city, in Huntington Hall, Massachusetts Institute of Technology, the American Dental Association. Sixteen years later the association was reorganized as the National Dental Association, which meets today in this historic city for its twelfth annual session.

A large majority of those who at that time assembled here have passed to the great unknown, and only a very few of them are present today. Many changes have taken place since then. The spot on which this building stands and many miles of the country about were a dreary waste of marshland, where the tide ebbed and flowed. The park opposite, known as the Fenway, has since been laid out, and other and greater improvements have been made which it is not necessary for me to enumerate.

On behalf of the Local Committee of

Arrangements, it is my pleasant duty to heartily and cordially welcome you to this far-famed and historic city, but I leave it to the distinguished speakers who are to follow me to describe to you the beauties of our state, city, and suburbs.

The committee has prepared for your pleasure various entertainments, which will be announced from session to session as occasion demands. We hope you will not fail to enjoy them all, and that when you return to your homes you will feel well repaid for the long journey which many of you have taken to be here today.

The state of Massachusetts is today represented by a gentleman well and favorably known throughout this union—a newspaper publisher, Spanish war veteran, orator, thrice governor of this grand old state, and our most popular chief magistrate. I have the honor and pleasure of presenting his Excellency Curtis Guild, Jr., governor of the commonwealth of Massachusetts.

Governor Guild. *Mr. President, Mr. Chairman, ladies and gentlemen,*—It is quite a pleasant privilege today to extend to this national assemblage a hearty welcome and every expression of good-will from the commonwealth of Massachusetts. This is a national organization, as I understand it, and I trust that during your stay here you will not be disappointed in regard to certain prevalent beliefs concerning the Bay State. Massachusetts means the place of big hills; it does not mean the place of big heads. We are proud of our local history and proud of our local achievements, but we are happier yet that we are one of the United States of America, and it will not be the fault of Massachusetts if every American does not find this his own home state during his stay.

I congratulate you most heartily on the progress of science in your particular profession. As we are all aware that the two buttons which we wear at the small of our backs on our cutaway coats are a souvenir of the times when these buttons supported sword belts, so the pole of the barber, with its stripes representing streaks of blood, remains to indicate the time when surgeon and barber were synonymous terms, the time when every surgeon kept a pole which his patients seized with a death-grip when their veins were being opened. The same man was the puller of teeth, the cutter of hair, and the letter of blood. We have advanced since that day; the profession of surgery has risen and become a benediction to the world; its specialties are divided into departments, and though across the water the profession is not as dignified as it should be, and people still call the surgeon "Mr.," here in these United States the professional man who works for the relief of human suffering is at least dignified by the term "Dr.," and the surgeon takes his place in the front rank of the scientific professions.

As I said, I trust that you will not be disappointed as to some of the popular delusions in regard to the old commonwealth of Massachusetts. Massachusetts has been called the state of mind. We trust that it is. It is in one sense a state of mind in that it is given up absolutely to the study of important matters, but to an assemblage of physicians of any kind we think that Massachusetts with her laws may be of particular interest. I trust that while you are here you may find time not merely for your study and for the various amusements prepared for you, but that you may have some time to look into our state institu-

tions, and study the medical legislation by which in this commonwealth every single public school throughout the state is subject to medical examination and supervision, so that if a child of the poor have any physical defects these may be remedied in childhood. The children of the poor as well as of the rich may have their defective eyesight, hearing, or digestion remedied in time, so that they may grow up to be not merely sound citizens, but useful members of the community. I trust you will take the time to examine the work of Massachusetts in caring for feeble-minded children, and see how these little ones are developed so as to become, if not quite equal to those more greatly blessed by Divine goodness, at least useful members of the community. I could wish that you would go to the settlement of feeble-minded boys, where these defective human beings have reclaimed waste land and transformed wild, useless lands into fertile soil, where they raise vegetables and produce dairy products with which all the families in the public institutions are fed.

But I need not go through the catalog of various institutions which would particularly appeal to you; I only wish to assure you, as one who in Massachusetts has served under a Southern general, that Massachusetts welcomes you not in a local spirit, but in the broad national spirit befitting the United States of America. We trust that you will go to the old commonwealth of Lexington and to Bunker Hill not as to places of local triumphs, but as to the beginnings of these United States of America; and remember that our public institutions, our homes, and the whole commonwealth of Massachusetts are open to you as to members of a noble profession which advances the cause of humanity throughout our whole broad beloved country.

Dr. Boardman. We are sorry that President Eliot of the great university of Harvard cannot be present with us today, but he has delegated as his representative a member of the medical department, the eminent and distinguished surgeon, Dr. Maurice H. Richardson of Boston, Mass., whom I now have the pleasure of presenting.

Dr. Richardson. *Ladies and gentlemen,*—I have been asked by President Eliot to say a word of welcome to you on behalf of Harvard University. I am all the more ready to do this, as the duty is a pleasure to me.

The profession of dentistry is no longer a minor specialty of medicine, and he who looks upon it as such takes a very narrow view of the subject. The field which it directly covers is, to be sure, but a small portion of the human anatomy, but it is a conspicuous and serviceable one. The functions of the mouth and jaws intimately concern nutrition, and the maintenance of their efficiency as a whole by means of the good preservation of the teeth is, broadly speaking, your profession. With all the progress that has been made in recent years in medicine and surgery, we cannot even now appreciate the far-reaching influence of the teeth, for good or for evil, upon human happiness and human effort, and I doubt if we ever could properly appreciate the inestimable value of the dental profession to the human race, unless we were deprived of its services.

Those of us who best realize the beneficent influence of a healthy mouth upon the whole economy, and who are

most deeply impressed with the far-reaching and evil influence of an unhealthy mouth, heartily rejoice to see the dental profession take the high position in medicine and surgery which its importance deserves.

We think that the dental profession, like all other professions, is most productive of good when it is most liberal in its education, and that the degree of D.D.S. should rest, both in theory and in practice, upon a broad foundation, not only of medicine and surgery but of the arts and sciences.

On behalf of President Eliot and Harvard University and on the part of the Harvard Medical School, I extend to you cordial greetings and best wishes.

Dr. Boardman. As the representative of another great institution of learning which is rapidly taking on university proportions, I now have the honor of introducing to you Mr. Frederick William Hamilton, president of Tufts College of Massachusetts.

President Hamilton. *Mr. President, ladies and gentlemen,*—It gives me great pleasure, as representative of Tufts College and Tufts College Dental School, to welcome this association to Boston, and place at its disposal the facilities of the school for clinical and other work in which you may be interested, a work which I am sure forms a large portion of the real import of this gathering.

In saying this brief word of welcome, I cannot forbear an additional word as to the feeling which the educational authorities, as far as I know, and myself in particular, cherish with regard to the profession which you represent, a profession which has just now arrived, as the French say. I can remember very well, although I am by no means an old man, when dentistry was regarded by the general public as a trade standing beneath the dignity of academic recognition, but we have learned better since those days. They were a relic of the barber-surgeon days, of which his Excellency reminded us, and we have come to realize the great importance of the profession which you gentlemen represent, and whose interests this convention is intended to advance.

I think of the dentist, with regard to human health and welfare, as of the "keeper of the gate," because it is through the gateway of the mouth that so many things which are hostile to human welfare find their entrance into the body. We are only just beginning to realize how important that gate is, just as in many other conditions of life we are beginning to see the importance of prevention. We behold in public life the sanitary engineers adopting preventive measures to guard the public health, and in like manner the work of dentistry is more than merely the alleviation of local pain and the removal of certain very distressful substances from our jaws. The present aim of dentistry is the prevention of the entrance of many of the ills which afflict the human body.

I suppose that in the course of your deliberations my friend Dr. Leary will have something to say with regard to the bacteriological importance of the mouth. We are beginning to realize the great significance of a culture-medium for many micro-organisms which find entrance into the system through diseases of the oral cavity. We are becoming aware of how important for all physiological processes is the integrity of that portion of the human anatomy which you are studying in order to guard it, and the men in charge of large educa-

tional institutions have come to think that no part of their work is more important than the training of the dentist. The training of the lawyer, of the physician, of the journalist, of the business man, of the minister, all are important in the make-up of what we call society, but not any more important than the training of the dentist. In the dental schools in Boston we are trying to do what we can for the advancement of dental education. We want to assist you gentlemen in the efforts which you are making for the advancement of the standards of your profession, enhancing its usefulness, and securing the future good results which will be surely obtained by a more thorough and more scientific pursuit of your profession. We are honored by your having chosen Boston for the meeting-place of this association. Our schools are honored by your presence; we are proud to put their facilities at your disposal. We are glad to testify to the appreciation which the governing body of Tufts College has of this department of that institution, and we wish you every success, not only in the meetings and in the work of this convention, but in the further progress of your profession in the years to come.

Dr. Boardman. We have with us today a devotee and member of our own profession—an editor, an orator, and the corresponding secretary of this association—who will respond to the addresses of welcome. I therefore present to you our colleague and friend, Dr. Burton Lee Thorpe of St. Louis, Mo.

Dr. Thorpe. *Mr. President, ladies and gentlemen,*—The question has been asked, "How can you tell a Boston man?" and the answer was: "You cannot tell a Boston man anything." Yet I rise to try to convey to these men of Boston, of the commonwealth of Massachusetts, and of this great section known as New England, how much we appreciate the cordial words of welcome which we have heard from these distinguished gentlemen, and how glad we are to be here to greet you, to grasp you by the hand, and to enjoy the hospitality which for many years the people of this section have been noted for. If I remember my history correctly, it was in this vicinity that a tea-party was given, on December 18, 1773, which was a decidedly warm reception. It is a rare pleasure for us who have come from various states and territories to assemble today in this historic city, this center of intellect and culture, where, it is said, every school child is more familiar with Emerson's essays than with "Grimm's Fairy Tales." I have heard that Bostonians are devoted to their city, that they think it the "hub of the universe," and we admire them for it. It is related that a man died and went to heaven. He knocked at the gate and told St. Peter he hailed from Boston. St. Peter said, "You may come in, but I know you won't like it."

Seriously, it is a rare privilege for us to be here on this sacred ground, baptized with fire and with the blood of the Pilgrim, the Puritan, and the patriot of the early day, many of whom lived, fought, and died here while exercising the dearest prerogative incident to American citizenship—liberty of thought and of speech, the privilege of worshiping God as they desired, and of a free education for their children; for it was here where for the first time in all Christendom a civil government took measures to confer on its youth the blessings of a free

education. Were it possible to add to the litany, I would make it compulsory for every American to daily say: "Blessed be the name of John Harvard, the founder of America's first and greatest university, for it was he who gave his fortune and his library for pioneer education."

It was the Puritans who inaugurated that sacred sentiment—the reverence for the sabbath. "Its influence penetrated their inner life," says John Harris Patton, "and like an all-pervading moral antiseptic, preserved in its purity the religious character of the entire people." This, together with their sterling virtues of honor and integrity, has done much to raise our citizenship to the high plane which it now occupies in Christianized civilization.

Our profession recalls with pride that in Boston a dentist lived whose name will ever be recorded in history as that of a great Revolutionary hero—he who, on the night of April 18, 1775, "while booted and spurred," anxiously watched the appearance of the signal light in the belfry of the Old North Church. His famous ride aroused the countryside to arms and fanned the flames of patriotism into a great fire, and the next day followed the battles of Lexington and Concord, and eventually American independence—

So through the night rode Paul Revere:
And so through the night went his cry of alarm
To every Middlesex village and farm,—
A cry of defiance and not of fear,
A voice in the darkness, a knock at the door,
And a word that shall echo forevermore!
For, borne on the night-wind of the past,
Through all our history to the last,
In the hour of darkness and peril and need,
The people will waken and listen to hear
The hurrying hoof-beats of that steed,
And the midnight message of Paul Revere.

—an American dentist.

In Boston also practiced Josiah Flagg, the first native American dentist, who first carried the knowledge of advanced original methods of operative procedure to England, and there was honored while a temporary resident of that country. Here also practiced such sterling pioneers as the Greenwoods, Joshua Tucker, Daniel Harwood, N. C. Keep, John Randall, Ira Salmon, I. J. Wetherbee, and Horace Wells, humanity's greatest benefactor, the discoverer of anesthesia by nitrous oxid; Thos. H. Chandler, Wm. T. G. Morton of ether fame, and the late lamented Thos. Fillebrown, the first president of this association, and whose presence is missed here today; peace to his ashes! New England gave us our greatest pioneer, Horace H. Hayden. She also has given us J. Leon Williams, Robt. R. Andrews, Wilbur F. Litch, E. S. Talbot, and others whose scientific contributions are a rich heritage, a priceless legacy to their *confrères.*

It is our hope that the seeds sown at this meeting may fall on fertile soil, and be an inspiration to the men of this section to work with renewed vigor for dental progress, and we cherish the confident belief that this meeting will be one of harmonious and unanimous action for the promotion of what is highest and best in American dental surgery. Again, gentlemen, I thank you, on behalf of this association, for your words of welcome that have broken down the barriers of formality and have made the stranger within your gates feel at home. Thank you for your kind greetings, and "All hail!" to our brothers in New England.

The report from the Executive Council was presented by the chairman, Dr. H. J. Burkhart, and was on motion adopted.

Dr. Wilbur F. Litch, vice-president from the East, was called to the chair, and the president, Dr. WILLIAM CARR, read his address. (See page 28.)

On motion the President's address was received and referred to a committee of three for consideration and report.

Dr. Litch appointed the following as the committee: Drs. J. D. Patterson, Wm. Crenshaw, and L. Meisburger.

The president, Dr. Wm. Carr, then resumed the chair.

The next order of business, as announced by the Program Committee, was the reading of a paper by TIMOTHY LEARY, M.D., Roxbury, Mass., entitled "Pyorrhea—Its Treatment by Vaccines and Other Agents." (See page 36.)

The general session then adjourned until Wednesday at 12 o'clock.

WEDNESDAY—Second General Session.

The general session was called to order Wednesday morning, July 29th, at 12 o'clock, by the president, Dr. Carr.

The first order of business was the report of the Executive Council, which submitted the report of the Committee on President's Address, and recommendation thereon—as follows:

REPORT OF COMMITTEE ON THE PRESIDENT'S ADDRESS.

Your Committee on the President's Address beg to report as follows upon the recommendations contained therein:

In regard to the first recommendation, referring to an amendment to the constitution providing for the organization of the Council for the ensuing year, we offer the following resolution:

RESOLVED, That in future, immediately following the election of officers, and prior to the adjournment of the association, the Executive Council shall hold an open meeting upon notice read to the association by the chair at the time of the election, at which meeting the Council shall organize and appoint committees and transact whatever business may be properly brought before it.

RESOLVED, That the recommendation of the President regarding the necessity of a uniformity in existing laws regulating the practice of dentistry throughout the United States be adopted.

RESOLVED, That the recommendation referring to army and navy legislation be adopted.

RESOLVED, That we recommend the adoption of that portion of the address referring to the increase of membership.

RESOLVED, That the publication of a national journal, as recommended in the President's address, be adopted.

RESOLVED, That action be taken regarding the revision of the by-laws as recommended.

J. D. PATTERSON,
L. MEISBURGER,
WM. CRENSHAW,
Committee.

The Executive Council recommends the adoption of the report of the Committee on the President's Address, with the exception of the clause which relates to army and navy legislation, which the Executive Coun-

cil has not had time to consider, but which will be considered this afternoon and reported upon tomorrow morning.

On motion the report of the Council was adopted.

Dr. BURKHART. I call up for action the amendment to the by-laws offered at the last meeting, to "Strike out in Section I, Article 4, the words, 'one for every six of,'" and I move that the amendment should read "That delegates may be received from any state society, district society, or local society affiliated with the state society, upon the certificate of the president and secretary of the state society, and that these delegates may become members by sending their certificate together with the fee to the treasurer of the National Dental Association," and that this amendment become operative at once.

The motion being duly seconded, was adopted unanimously.

Dr. BURKHART. The Council recommends that this association adopt a resolution approving the recommendations made by Dr. J. Leon Williams, London, Eng. [as read before Section I, see page 87], entitled "A Plea for More Scientific and Esthetic Artificial Teeth."

On motion the recommendation was adopted.

A communication received from Dr. E. Sauvez, vice-president of the National Dental Federation, transmitting the program of the F. D. I. meeting at Brussels on August 6–9, 1908, and also bespeaking an active interest in the Fifth International Dental Congress, to be held at Berlin in August 1909, was read.

Dr. BURKHART. I move that the president and secretary be empowered to issue certificates to members of the National Association in good standing who may desire to attend the International Dental Congress to be held in Berlin in 1909.

Motion carried.

Dr. R. OTTOLENGUI then presented a constitution and by-laws for the consideration of the association, which was on motion referred to the Committee on Revision of By-laws.

Dr. J. D. PATTERSON then read the report of the Special Committee on Oral Hygiene. (See Executive Council meetings, page 17.)

The next order of business was the reading of a paper by Dr. GEORGE A. BATES, Auburndale, Mass., on "Some Studies in Heredity as Illustrated by the Ovum."

On motion the association adjourned until Thursday at 12 o'clock.

THURSDAY—Third General Session.

The general session was called to order by the president, Dr. Carr, at 12 o'clock Thursday morning, July 30th.

The first order of business was the reading of a paper by H. H. GERMAIN, M.D., Boston, Mass., entitled "Tumors of the Mouth." (See page 45.)

The next order of business was the report of the Committee on Necrology, by the chairman, Dr. W. F. LITCH, Philadelphia, Pa., as follows:

REPORT OF THE COMMITTEE ON NECROLOGY.

It becomes the sad duty of the Committee on Necrology to report the death of one whose loss is keenly felt by his fellow members in the National Dental Association, of which he was the first president, following the merging of the American Dental Association and the Southern Dental Association, and the organization of the present national body.

Dr. Thomas Fillebrown.

Thomas Fillebrown, M.D., was born in Winthrop, Maine, January 13, 1836, his father, Dr. James Bowdoin Fillebrown, being a practicing dentist in that town. His son, Thomas, was educated in the public schools, the Towle Academy, and Maine Wesleyan Seminary. From the last-named institution he was graduated in 1859, and in it became for a time a teacher of higher mathematics.

Having determined to adopt dentistry as a profession, he entered the office of his father as a student, and in 1861 matriculated in Bowdoin Medical College, from which school he was graduated with the degree of M.D. in 1863.

After several years of dental practice in Lewiston and Portland, Maine, he moved to Boston, and in 1868 matriculated in the first class of the Harvard Dental School, which was organized and held its first session in that year—and was graduated with the degree of D.M.D., March 10, 1869. In this school he became an instructor, and was appointed to the chair of operative dentistry and oral surgery, a position which he held for twenty-one years with distinction and success.

Dr. Fillebrown made many valuable contributions to the literature of his profession. As an author he was best known by his textbook on Operative Dentistry. As an oral surgeon Dr. Fillebrown attained distinction, and was recognized as a highly skilled and successful operator, especially for hare-lip and cleft-palate deformities. He was keenly interested in the subject of anesthesia, and devised methods of administering anesthetics which much lessened the discomfort and danger for the patient. At the sessions held under the auspices of the American Dental Association, at Philadelphia, December 11, 1894, in commemoration of the fiftieth anniversary of the discovery of anesthesia by Horace Wells, Dr. Fillebrown was selected as chief essayist, and read a scholarly and in every way admirable paper on "The History of Anesthesia."

In addition to his services as president of the National Dental Association (1896-97), Dr. Fillebrown served as president of the Massachusetts State Dental Association, and was at the time of his death president of the American Academy of Dental Science. He was a member of the Massachusetts Medical Society, the Maine Dental Society, the Maine Medical Association, and the American Medical Association.

Of Dr. Fillebrown's personal worth and endearing personal qualities all who knew him bear testimony, and it is fitting that this association also should place on record a formal expression of its appreciation of those qualities and of the value to his profession, to this association, and to humanity, of his long, honorable and useful life.

The Committee on Necrology offer the following resolutions:

Whereas, Death has closed the distinguished and useful career of Dr. Thomas Fillebrown; therefore be it

RESOLVED, That the National Dental Association, of which he was an honored ex-president and valued and faithful fellow member, bears testimony to his exalted worth as a man and to the value of his services as teacher, author, and practitioner.

RESOLVED, That by his death the association has lost a devoted fellow member and the dental profession one whose life was an inspiration and an example, and the fruit of whose labors will long remain as a legacy to his professional co-workers in this and coming times.

RESOLVED, That these resolutions be spread upon the minutes of the association, and that a copy be transmitted to Dr. Fillebrown's surviving family, with assurances of our profound sympathy with them in their great bereavement.

WILBUR F. LITCH, *Chairman*,
E. S. GAYLORD,
H. B. TILESTON,
CHARLES W. RODGERS.

On motion the report of the Committee on Necrology was adopted.

The Executive Council, through its chairman, Dr. BURKHART, made the following report:

The printing of the Transactions for this year has been awarded to the *Dental Cosmos* as heretofore.

The Council begs to present for unanimous indorsement the following resolution in reference to army and navy legislation:

RESOLVED, That the thanks of the National Dental Association are tendered to the Committee on Army and Navy Legislation, and to all members of the profession who have faithfully co-operated with said committee, and we respectfully request that the committee urge Congress to pass Senate act 4432 of the 60th Congress; also House bill 16,620 of the 60th Congress; and be it further

RESOLVED, That the Committee on Army and Navy Legislation be furnished with a copy of these resolutions, and be empowered to act in all matters pertaining to the question of legislation looking to the improvement and elevation of the service of the dental surgeon in the army and navy of the United States of America—this authority being indicated by the official seal of the National Dental Association of the United States.

The Council also reports a resolution thanking the Boston newspaper men for their courteous treatment of the members of the National Association during their stay in Boston. The Council also passed a resolution thanking the local committee of arrangements for the splendid part which they have had in making the meeting a success. We also desire to express our appreciation to the local members of the association, and to the members of the profession in New England for the hospitality which has been extended to the association during the meeting. We further offer a resolution of thanks to the management of the hotel for the many courtesies extended, and for the splendid quarters provided for this meeting, which undoubtedly have been the best that we have had in many years.

We have also to report the resolution which has been presented by Dr. Merritt, indorsing the movement in favor of devising ways and means to suppress tuberculosis, and to bring the indorsement of the National Dental Association before the International Congress of Tuberculosis which is to meet in Washington.

(For Dr. Merritt's resolution see report of Executive Council, page 22.)

Dr. BURKHART. I move the adoption of the various resolutions and recommendations.

Motion carried.

The next order of business was the selection of the place for holding the annual meeting.

A ballot was taken, and Birmingham, Ala., selected, and the Executive Council empowered to fix the date.

ELECTION OF OFFICERS.

The election of officers for the ensuing year was then taken up, and resulted as follows:

President—Dr. V. E. Turner, Raleigh, N. C.
Vice-president for the South—Dr. Wm. Crenshaw, Atlanta, Ga.
Vice-president for the East—Dr. E. H. Smith, Boston, Mass.
Vice-president for the West—Dr. W. D. Chambers, Denver, Col.
Corresponding Secretary—Dr. H. C. Brown, Columbus, Ohio.
Recording Secretary—Dr. C. S. Butler, Buffalo, N. Y.
Treasurer—Dr. A. R. Melendy, Knoxville, Tenn.
Executive Council—H. J. Burkhart, B. Holly Smith, A. H. Peck, F. O. Hetrick, W. E. Boardman.
Executive Committee—J. D. Patterson, H. B. McFadden, C. J. Grieves.

Dr. J. Y. Crawford. For thirty-four years I have been connected with the dental profession in America through this association, and for thirty-four years I have been associated with this association in an official capacity. I have been honored far beyond my deserts, but it has always been my desire to do what little I could toward the advancement of dentistry and dental surgery in this country, and it grieves me to think that I must sever my official connection with this association. I shall, however, ask the privilege of always remaining a faithful active member, and I hope that next year the great East and the great West will come to the lovely South, and help us to have the greatest meeting that has ever been held on the American continent. While I shall not be officially connected with the association, I shall be there and do what I can to help in the consummation of my expressed desire. I wish to most heartily thank the members of the dental profession for the great courtesy and consideration with which they have uniformly treated me during these thirty-four years, and I wish you and the profession all the success that can be accomplished along legitimate lines.

On motion, the association adjourned until 4 P.M.

THURSDAY—Fourth General Session.

The fourth general session pursuant to adjournment was called to order by the president, Dr. Carr, at 4 P.M.

Dr. Burkhart presented the following resolution from the Executive Council:

Resolved, That the President and Executive Council be empowered to appoint the committees for the following year at their convenience.

On motion the resolution was unanimously adopted.

The newly elected president, Dr. V. E. Turner, was escorted to the chair by Drs. Meisburger and James McManus and installed into office.

Dr. Turner in a few words thanked the association for the great honor conferred upon him by his election to the presidency for the ensuing year.

Dr. Butler moved that the association extend a rising vote of thanks to Dr. Carr, the retiring president, for his un-

tiring and effective efforts on behalf of the association during his administration.

The motion was carried unanimously by a rising vote.

Dr. BUTLER moved that the Executive Council be empowered, in case of necessity or apparent desirability, to change the place of meeting for next year.

The motion was carried.

There being no further business to come before the association, motion was made and carried that the National Dental Association stand adjourned until its next annual session.

MINUTES

OF THE

Meetings of the Executive Council.

First Meeting.

THE first meeting of the Executive Council was held in Boston, Mass., on July 28, 1908, at 9 A.M., with the following members present: Drs. H. J. Burkhart, chairman, Wm. Carr, B. Holly Smith, F. O. Hetrick, J. Y. Crawford, C. S. Butler, and Charles McManus as proxy for Dr. A. H. Peck.

On motion the program as prepared and published was made the official program of the meeting, with the provision that Section I be called at 2.30 P.M., Section II at 8 P.M., and Section III on Wednesday at 2.30 P.M.

On motion, Dr. Timothy Leary's essay was ordered to be read immediately after the President's address, Dr. George A. Bates' essay at 12 M. on Wednesday, and Dr. H. H. Germain's at 12 M. on Thursday.

The Secretary presented bills for printing, postage, stationery, etc., which were upon motion referred to the Auditing Committee. The reports of the Committees on Dental Journal and Oral Hygiene were read and on motion received and ordered printed.

On motion the Council adjourned until 2.30 P.M.

Second Meeting.

The second session of the Executive Council was held at 2.30 P.M., with all the members present.

The following communication from the Massachusetts State Dental Society was read by Dr. SAMUEL A. HOPKINS:

BOSTON, July 28, 1908.

The Massachusetts Dental Society through this committee [as undersigned], petitions the Executive Council of the National Dental Association to present with their indorsement and approval the following suggestions and resolutions to the National Dental Association for action by that body:

(1) That steps be taken immediately to establish a representative journal of the society.

(2) That steps be taken immediately to reorganize the society and enlarge its membership.

(3) That such tariff changes be made as the foregoing changes may render necessary.

(4) That the reorganization of the society shall be along the lines of the American Medical Association, and that all members in good standing of state, district, and county societies, and such other societies as may be determined upon, be eligible for membership in the National Dental Association.

[Signed] SAMUEL A. HOPKINS.
ANDREW J. FLANAGAN,
FRANK T. TAYLOR,
Committee.

The general subject of the communication was discussed by Drs. Hopkins, E. H. Smith, A. J. Flanagan, H. A. Kelly, H. L. Wheeler, R. Ottolengui, E. C. Briggs, and E. A. Bogue.

On motion the communication was received and referred to the Committee on Revision of the Constitution and By-laws, to be appointed under the recommendation of the President in his annual address.

The report of the Legislative Committee was read by the chairman, Dr. DONNALLY, as follows:

REPORT OF THE LEGISLATIVE COMMITTEE.

To the Officers and Members of the National Dental Association:

It is now ten years since the National Dental Association began the only real and determined effort ever made to secure to the army and navy *personnel* the indispensable benefits of an efficient dental service, and to acquire for the dental profession of America a military status commensurate with the value and importance of its function and with its civil status at home and abroad. Your committee, and many others of the profession, in a measure realized from the beginning of this effort that the promotion of the object sought would, under the most favorable circumstances, involve administrative and legislative problems far-reaching and diversified in their relations, as well as delicate, intricate, and complex in their nature. Hence no reasonable and well-informed person could have expected that we would escape opposition *from without our own ranks* to the introduction of such an innovation into the conservative policy and customs of the army and navy, nor that we could have avoided questions as to the equity of the claim on which we base the demand for large expenditures of the people's money and ask for dentistry an official recognition of equality with the older learned professions represented in the army and navy staff corps. Yet, in the study and pursuit of the object, only a very limited number have become fully aware of the variety, diversity, and resourcefulness of the antagonistic influences. To all thoughtful persons it must appear that a monumental achievement was accomplished when, in 1906, substantially all the official warfare against the main objects of the proposed legislation was silenced, and the terms of an Army Dental Corps Bill were accepted and agreed upon by those whose official assent was a necessary precedent to their enactment. The history, the terms, and the parliamentary status of that bill, as the result of fully eight years of unceasing, unselfish, and well-supported effort on the part of large numbers who were loyal to the profession's interest, were creditable to the wisdom, fidelity, constancy, and consistency with which your committee planned and pursued its policy. That bill—Senate bill 2355, 60th Congress—represented, in 1906, an achievement of the profession over its natural antagonists that will never again be equaled, but will rather increase in brilliancy as it acquires historic perspective.

The importance of its passage would not have been confined alone to its application as an army dental corps measure, because it would have become at once a precedent and pattern for navy dental legislation, as to its terms the highest naval authorities at Washington had already assented. Further, it would have had an influence in establishing army and navy dental service in other countries.

But why were this and the pending Navy Bill, the history and status of which has been fully covered in former reports, not passed? The answer is that the cause is within your own membership and without that of your Committee on Legislation. It is therefore your duty to go more fully and clearly on record in

your own conception of the cause and the remedy for it, in order that the National Dental Association may not, as the representative of the profession, be responsible for the dishonor, the humiliation, and the loss of prestige which the profession necessarily suffers at Washington. The association's honor and interest should be regained and protected, even though it costs every prospect of early army and navy dental legislation, by a strict adherence to absolutely correct principles, by unequivocal and emphatic declaration in favor of recognized right, and by an equally forcible and emphatic expression of condemnation of known wrong. With such a declaration on the part of the membership, under the official seal of the association, there should be no further doubt in the minds of the members of the profession, nor of the government authorities at Washington, as to your attitude toward the bills, or as to your confidence in and co-operation with your authorized representatives.

We warn you that the greatest danger to the independent and self-respecting attitude of this association lies in the recent movement to so turn and manipulate medical association action in reference to army and navy legislation as to render valueless your influence in shaping the terms of army and navy dental bills. We utter this warning with respect to those who feel that the dental profession, not the medical, should dominate in determining the provisions of proposed legislation which affect the status of dentistry in its relation to all other professions and to the public, and who feel that the government should be impartial and free from the influence of any profession's prejudice.

In epitomizing the interpretation of the Senate bill 2355, 59th Congress, we state that it provided for the attachment of a corps of dental surgeons to the medical department of the army, with three grades of rank—namely, first lieutenant, captain, and major—entrance to be made through the rank of first lieutenant, after meeting the usual and unavoidable age examination and citizenship requirements. A notable exception was made in favor of army contract dental surgeons in that there was for them neither age nor re-examination requirements, three of them being granted captaincies and all of them longevity pay from the date of their respective original contracts. There was also a reasonable limitation on the number of promotions to be earned. The examining-board clause was originally so framed that the Surgeon-general could retain one or two of the more elderly in case they should be barred by the introduction of an age amendment.

In this liberal form the bill had the indorsement of the Surgeon-general, of the Senate military committee, of the Senate as a body, and in a form affecting adversely only one of the thirty dental surgeons it was favored by a majority of the military committee of the House. In contrast with that most favorable condition in 1906, the present condition is as follows:

The Surgeon-general, backed by the general staff and the Secretary of War, now opposes Senate act 4432, 60th Congress, which act is the same as original Senate bill 2355 except as to the examining-board clause, which clause was changed without our favor and in opposition to the Surgeon-general so as to exclude from it any one or two of the contract men who might fail to acquire rank. The bill was highly favorable to all those in the contract dental service, granting as it did each and every one substantial favors denied army contract surgeons, neither discriminating nor militating against one of the whole number. As an evidence of the correctness of this we cite the views of this committee as they were adopted by the Judge Advocate-general and put into the form of a response to a United States senator who was and is a member of the Senate military committee.

In January of the current year Senator Bulkeley offered the original provisions of Senate 2355 as an amendment to the then pending medical bill. While we were embarrassed, with the Surgeon-general, and made the best of this unexpected move, we consulted with both Senator Bulkeley and the Surgeon-general and made the best of a delicate situation, showing such support to Senator Bulkeley as we then felt and now feel was necessary to get the dental bill through the Senate as a separate bill, independent of the medical bill. Accordingly, the bill was reported as an independent bill, and passed

the Senate January 29, 1908, having first been amended in committee by the same change in the board clause that was made by Senate bill 2355. Since that date it has been pending before the House military committee, which, after several times deferring action, finally postponed the consideration and disposition of the bill until December 1908.

In our judgment, the best and only chance for a reasonably favorable bill is to support strongly with all the resources of the profession the bill as it passed the Senate. If the dental profession unites on this bill as the medical profession did on its bill, a favorable result may follow, even though further amendment should be found unavoidable.

The same navy dental bill heretofore reported three times by the House naval committee is now on the calendar. It provides for the actual rank and compensation of assistant-surgeon in the navy for thirty navy dental surgeons. The rank is actual, and differs from the regular rank only in that it fails to provide for promotion from one grade of rank to another, and also fails to provide for age retirement on half-pay. Though this bill has failed heretofore because it lacked the favor of the chairman of the Senate naval committee, we still hope and expect this bill to pass Congress. However, should the army bill first pass, the grades and kind of rank in the navy would doubtless be made to correspond to that of the Army Dental Act. The ill-advised and ill-disguised purpose to oppose the Surgeon-general and the Senate naval committee chairman by seeking to amend this bill has exercised a pernicious influence, because of the fear on the part of the authorities that no agreement entered upon by your association would be respected and adhered to by your whole membership. There has also been some dissatisfaction within the profession resulting from misrepresentation of the meaning of the terms of this navy bill—some of our former good helpers having been made to believe that it is no more than a "contract measure."

We do not pretend to account for the motives which have prompted interference with the passage of these bills. As said before, it is your honor, your influence, and your prestige which suffer, and it is your place and within your power to apply the remedy. Personally your committeemen have nothing to gain by the success nor to lose by the defeat of this great interest of the profession. We have only that loyalty, unselfish interest, and pride in the welfare of the profession which should prompt every loyal and honorable man to do well, faithfully, and unselfishly that which the association assigns to him to do; and to leave alone, as decency and self-respect require, that which the association assigns to others to do.

We recommend prompt and definite determination of the *personnel* of the Legislative Committee, because the current year's plans and work should begin at this meeting, and should be well in hand, if not largely accomplished, before the meeting-time of Congress. We also recommend the issuing of a certificate, under the seal of the body, of the authority of the Committee on Legislation as the sole representative of the National Dental Association.

WMS. DONNALLY, *Chairman*,
M. F. FINLEY,
EUGENE H. SMITH,
E. J. TUCKER,
B. HOLLY SMITH.

The general subject of army and navy dental legislation was discussed by Drs. R. Ottolengui, M. L. Rhein, E. A. Bryant, James McManus, J. D. Patterson, and B. Holly Smith, until five o'clock, when on motion the Council adjourned to meet at 11 A.M., July 29th.

Third Meeting.

The third session of the Executive Council was called to order by the chairman, Dr. Burkhart, at 11 A.M., July 29th, with all the members present.

The report of the Legislation Commit-

tee was again taken up, and on motion was received and referred to the Publication Committee.

Adjourned to 3 P.M.

Fourth Meeting.

The Council re-convened at 3 P.M. with all the members present.

The question of the International Dental Congress, to be held in Berlin, Germany, in 1909, was taken up, and the President was requested to appoint a committee of three on Essays and a committee of three on Clinics, and that only such essays and clinics as shall be acceptable to these committees be entered upon the program from America.

The President subsequently appointed the following: Committee on Essays—Drs. E. C. Kirk, B. L. Thorpe, and L. P. Dotterer. Committee on Clinics—Drs. Wm. Carr, J. D. Patterson, and C. L. Alexander.

On motion, the President appointed the following as the Committee on the Miller Memorial Fund: Drs. T. W. Brophy, Wm. Carr, and B. Holly Smith.

On motion a permanent Committee on Scientific Research was created, and Drs. H. C. Ferris, A. W. Doubleday, Joseph Head, F. W. McCall, and C. W. Strang were appointed for the ensuing year.

The following report of the Special Committee on Revision of the Hygiene Report was presented by Dr. J. D. PATTERSON, and on motion was ordered read at the general session on Thursday:

REPORT OF THE SPECIAL COMMITTEE ON REVISION OF THE HYGIENE REPORT.

To the Members of the National Dental Association:

Your committee to whom the report of the Committee on Oral Hygiene was referred at the last annual meeting, held in Minneapolis, Minn., in 1907, desire to make the following report:

It has been a difficult matter for your committee to determine precisely what the members of the association required of them—whether we were required simply to review and correct the report placed in our hands, or to offer or suggest more radical changes.

In the first place, it may be stated that the object sought is to prevent or cure dental disease, covering all classes of people.

Second: To place before the people in a manner to be read, understood, and acted upon, directions and suggestions for the prevention of dental disease which will reach and benefit the greatest number.

Third: To publish this information under the auspices of the National Dental Association, for the purpose of fulfilling a professional duty, and believing that such publication would have greater weight when authorized by the highest authority in the dental profession of America.

In looking over the field and carefully considering the report given into our hands, we are at once constrained to give great praise to the committee making the report, for it has involved much labor and shows that a very earnest purpose guided its completion; but we are compelled to say that it is our belief that the report before us will not best assist us in attaining the objects above set forth.

The objections to the report are nearly all on account of its great length. The subjects of the "Ideal in Dentistry," "Evolution and Development," "Involution and Decline," "The Teeth in Embryo," "The Teeth in Childhood," "The Teeth in Mature Life," "Causes of Decay," "Neuritis," "Trauma," "The Duty of the Dentist," etc., are gone into with so much discursiveness that it covers some

thirty-six pages of typewritten matter, and would make a printed book or pamphlet of some thirty-two pages.

We think it must appeal to all who are experienced that a pamphlet of this size will not be read by any great number of those we desire to reach. However important and correct the subject-matter is, few will be found enough interested to study it or hold in mind the matter therein contained.

Your committee are firmly of the opinion that the most important thing is that the information upon the care of the teeth and the mouth shall be so brief that it can be taken in almost at a glance, and in such form as at once to fix the attention; that it shall not consist of more than four pages, and be so inexpensive that it can be published for a few cents a hundred copies, thus placing it within reach of every dentist in the country for free distribution, and within reach of every school in the land for free distribution, that it may be supplied to hospitals, to nurses, to factory hands, to mill operatives, to clerks, to the high or the low, to the rich or the poor.

Your committee have therefore formulated a brief statement upon the care of the teeth and the mouth, and offer it for your consideration as a substitute for the report placed in our hands.

It is as follows:

The Mouth and the Teeth.

(Published by the National Dental Association.)

Copyrighted 1909.

A HEALTHY mouth and sound teeth are essential to the general well-being. Many diseases of the body cause unhealthy conditions of the mouth and teeth, and, on the other hand, diseases of the mouth and teeth are prejudicial to the general health.

The value of a good set of teeth can hardly be overestimated, for mastication is the first step in a series of processes by which the food is transformed into nourishment adapted to the needs of the system. The teeth are also important aids in forming speech and in maintaining the symmetry of the features. For these reasons all causes promoting destruction of the teeth should be avoided.

Decay is not the only enemy of the teeth; inflammation and absorption of the gums and sockets, chiefly caused by the presence of tartar, is alarmingly frequent, and results in the loss of very many teeth.

To prevent decay of the teeth as well as the destruction of their sockets, the one great essential is *cleanliness of the mouth.*

Are the temporary teeth of much importance?

They are, and should be cared for from their first appearance until they are displaced by their permanent successors. A child needs teeth for mastication as much as does an adult. If the first teeth are decayed, chewing is painful and is avoided and the habit of swallowing food unchewed becomes established. The results of this practice are indigestion and many stomach and bowel disorders. If decayed and painful first teeth are prematurely extracted, the result is generally irregularity and crowding of the second set, they being thus made unsightly, inefficient for chewing, and more liable to decay.

How long should the second set of teeth last?

To the end of life.

How do we lose teeth?

Chiefly by decay and loosening.

What causes teeth to decay?

Decay is caused by the fermentation of the remains of food clinging between the teeth and in their depressions, with the production of an acid.

Can decay be prevented?

Yes, to a large extent.

How can decay be prevented?

By scrubbing the teeth thoroughly with a tooth-brush, tooth-powder, and water, and by the preservation of the general health.

What causes teeth to loosen?

Chiefly the presence of tartar.

How can the loosening of teeth be prevented?

By preventing the accumulation of tartar or other irritants which inflame the gum around the tooth, by scrubbing with brush and powder, the same as for the prevention of decay. Tartar which cannot be reached

by the brush should be removed by the dentist.

How often should the teeth be cleaned?

At least twice a day; in the morning and at bedtime; better after each meal. The after-meal cleansing should not involve a too vigorous use of the brush.

What kind of a tooth-powder should be used?

For purposes of simple cleanliness in a fairly healthy mouth, the best tooth-powder is made of some alkaline substance such as precipitated chalk of magnesia, so finely powdered as to be without perceptible grit, and flavored to taste as desired, with aromatic oils such as oil of wintergreen, oil of peppermint, etc. The powder should not contain orris-root or other starchy vegetable matter. In cases where the gums or teeth, or both, are much diseased, special powders or lotions are needed; these should be prescribed by the dentist.

How often should the tooth-powder be used?

At least once a day, preferably at bedtime.

How should the tooth-brush be used?

Skill and care, and not force, are required to secure the best results. The most effective routine is to first rinse the mouth with tepid water to wash away particles of food; next use the brush without powder to dislodge any particles remaining about the teeth, rinse again with water, and lastly, use the brush with powder to better scour the teeth. By its alkalinity the powder helps also to neutralize the acids causing tooth-decay. The usual crosswise brushing often forces food into the spaces between the teeth, where it does the most harm. To remove it, the brush should have bristles well apart and in uneven lengths. For the inner and outer surfaces, the teeth should be brushed downward and upward; for the grinding surfaces, backward and forward and from side to side; in this way all parts of the teeth can be cleansed from foreign matter. It should be kept in mind that the surfaces most difficult to reach are the ones requiring the greatest care. This very thorough brushing is required only once a day. It must be remembered, however, that some mouths and teeth are more subject to disease than others, and require greater care.

The use of a quill toothpick and waxed floss silk will remove food particles that cannot be dislodged with the brush. In using the silk, care must be taken not to unduly force the silk upon the gum and injure its union with the neck of the tooth. A similar injury can be caused by the improper use of the toothpick.

How often should the dentist be visited?

At least twice a year; when unusual conditions predisposing to decay and gum trouble are present, the visits should be made more frequently.

For the cure of unhealthy conditions resulting in a predisposition to decay of the teeth and diseases of the gums, systematic as well as local treatment is often necessary. Usually the treatment found most effective is that which promotes the general health of the patient, and includes nutritious food, sunshine, exercise, and sleep.

On motion the report was received and adopted and the proposed pamphlet ordered copyrighted and printed.

Dr. W. H. Potter presented the following pamphlet, which had been prepared by the Dental Hygiene Council of Massachusetts, and suggested that it be referred to the Special Committee on Oral Hygiene:

Care and Use of the Teeth.

What are the teeth for?

Not merely for ornament. Their chief use is to prepare the food for the stomach —to grind the food and mix it with saliva. Food which is not thoroughly chewed causes indigestion and constipation.

How long should the teeth last?

To the end of life.

How do we lose them?

By decay and loosening.

What causes teeth to decay?

Bits of food and candy sticking to the teeth; also a poor physical condition.

Where does the food lodge?

All along the edge of the gums between the teeth, and in the crevices of the grinding surfaces.

Can decay be prevented?

Yes, to a large extent.

How can decay be prevented?

By scrubbing the teeth thoroughly with a tooth-brush, tooth-powder and water; and by keeping up the general health.

How often should the teeth be cleaned?

At least twice a day—after breakfast and at bedtime. Better after each meal.

Should the gums be brushed?

Yes. Moderate friction helps to keep them healthy.

How often should tooth-powder be used?

At least once a day—at bedtime.

Twice a year, at least, a dentist should carefully examine the teeth.

A bad condition of the throat, the nose, and the ears is made worse by decayed teeth. They add to the chances of catching infectious diseases. Well-cared-for teeth and a clean mouth help prevent TUBERCULOSIS.

Cleanliness is the best guard against disease.

Referred to the Special Committee on Oral Hygiene.

The Committee on Army and Navy Museum presented the following report, which was received and was referred to the Publication Committee:

REPORT OF THE COMMITTEE ON ARMY AND NAVY MUSEUM.

BOSTON, MASS., July 28, 1908.

To the Officers and Members of the National Dental Association:

At the thirty-fifth annual session of this association, held at Asbury Park, N. J., August 6, 1895, the following resolution was adopted:

"RESOLVED, That this association formally adopt the Army Medical Museum and Library as the national museum and library of the dental profession of the United States."

Since the adoption of this resolution your Committee on National Museum and Library have frequently urged the importance of taking advantage of the opportunity herein afforded to the dental profession for accomplishing essential purposes otherwise impossible of attainment. Quoting from a former report, "Never was there opportunity more freely offered a profession to demonstrate its value, to acquire a higher rank among the learned callings, to acquaint the professions and the general public with its achievements, and to secure the preservation, classification, exhibition, and facilities for studying all subjects pertaining to it of historical and educational value, present or in the future. It would lead to loss of prestige and would be altogether inconsistent with the general course and progressive spirit of the dental profession if we fail to utilize equally with other specialists and the general physicians and surgeons of the country, the immeasurable advantages of this institution, containing as it does, within a building erected for the purpose, all available material pertaining to every branch of medicine and surgery."

The Army Medical Museum, in some respects first of its kind, contains more than 50,000 specimens.

The Army Medical Library is the largest and most complete in its line in existence, containing the best collection of dental works and dental literature in the world.

As a profession and as individuals, we should have the necessary pride and interest in this great institution—an institution founded and maintained by the government—to insist that this work be urged forward with all possible speed.

The committee, therefore, requests that any instructive specimen of general interest in the possession of dental colleges, societies, or individual members of the profession, be contributed to this collection. They will be properly cared for and accredited to the donors.

All specimens which are of dental classification, coming to the museum from whatever source, are immediately diverted to the dental exhibit.

The efforts of the committee to make additions to the museum have been generally by personal solicitation, believing that more can be accomplished by this method than by circulars or correspondence.

Your committee wishes to acknowledge the gift to the museum, by the American Society of Orthodontists, of a series of one hundred and sixty plaster models of dentures, showing conditions before and after orthodontia. These have been properly classified and indexed, and of themselves form a most valuable study.

Also a series of seventy-two transparencies, showing especially the anatomy of the jaws and teeth and impactures of the teeth and anomalous frontal sinuses, presented by Dr. M. H. Cryer. They have been mounted and indexed, and form a most useful collection.

Your committee wishes to acknowledge the courtesy and valuable assistance of Dr. D. L. Lamb, in charge of museum exhibits, and Dr. H. E. Kelsey of Baltimore, Md.

Respectfully submitted,

G. W. Boynton,
M. F. Finley,
Wm. B. Dunning,
E. G. Link.

Dr. J. P. Corley, chairman of the Committee on Oral Hygiene, presented the following report, which on motion was received and referred to the Publication Committee:

REPORT OF THE COMMITTEE ON ORAL HYGIENE.

Mr. President, and members of the National Dental Association:

Your Committee on Oral Hygiene submits the following report:

By an unhappy combination of circumstances your chairman was the only member of the committee who was able to serve. The work has therefore been limited.

With the purpose of laying a foundation for a system which will ultimately reach the general public, if prosecuted by those who come after us, we have projected the work along three general lines.

Realizing that we must first educate the dentist, and then the teacher, before we can hope to reach the layman, we have endeavored to persuade the dental colleges to increase their instruction on the subject of oral hygiene and dental prophylaxis.

We regret to report little encouragement in this direction, and it is the saddest fact of all, since it lies at the very fountain-head of the dental *régime*. We have asked for an audience before the National Association of Dental Faculties, but they were too busy to entertain the matter.

The second feature of the scheme has been an effort to induce the state examining boards to ask a set of questions on the subject. In this field we are glad to report more success. Many of the state boards have concurred in the plan, and have made some startling discoveries both as to the need and possibilities of the system.

The third and most immediately fruitful line of work has been with the state associations in an effort to secure their co-operation. We have asked that they create standing committees to act as sub-committees to the National committee; that they have immediate supervision of the work within their own territory; that they will execute the plans of the National committee, with such changes and modifications as may be thought best to meet the needs of their special field, and that they submit an annual report to the National committee.

While some of the associations have replied that they had so much business of importance that they had not time to take up the matter of hygiene, a goodly number have enthusiastically adopted it. Foremost among these I might mention the Alabama Association. Their work has been so excellent that I am submitting a *résumé* of their proceedings, and if it be your good pleasure I shall read the same. It will serve to show by what a simple plan the National Association could revolutionize the status of dentistry.

* * * * *

We suggest that the state medical boards might be induced to give questions pertaining to dental pathology and prophylaxis which would require the medical colleges to give some much-needed instruction in this important field.

Your committee seems unable to get the National Association to discuss the subject, or to suggest plans for the promotion of the cause, or to indorse those proposed by the committee. In fact this body has shown an astounding apathy in regard to the work,

and the situation is discouraging beyond measure. The only hope lies in the possibility that you may sometime name a committee which can get the ear of the association.

Respectfully submitted,

J. P. Corley, *Chairman.*

Dr. H. L. Wheeler, secretary of the Committee on Dental Journal, presented the following report:

REPORT OF THE COMMITTEE ON DENTAL JOURNAL.

July 27, 1908.

To the Executive Council of the National Dental Association:

Gentlemen,—Your Committee on Dental Journal believes it both wise and necessary in the interest of the growth and development of the profession which our association represents, and for the welfare of the association, that we establish and publish a professional dental journal.

To that end we recommend that such a journal be established by this association.

We recommend that a permanent committee of five be appointed by the president, with power to take the necessary steps to carry these recommendations into effect, so that at the annual meeting of the association in 1909 preparations may be fully completed, by the securing of ways and means, to publish proceedings and other scientific matter, procure and accept advertisements, and do all the work necessary to carry on a scientific publication.

Respectfully submitted,

E. K. Blair, *Chairman,*
Herbert L. Wheeler, *Sec'y.*

After long and careful discussion the report was received, and in conjunction with the recommendations of the president in his annual address, was adopted, and the following committee appointed: Drs. H. L. Wheeler, New York; C. S. Butler, Buffalo; F. T. Taylor, Boston; W. B. Dunning, New York, and F. W. Stiff, Richmond, Va.

The Council then adjourned to meet at 4 P.M. on Thursday, July 30th.

Fifth Meeting.

The Council re-convened at 4 P.M. on Thursday, July 30th, and organized by the election of H. J. Burkhart, chairman, all the members being present.

The following communication from Dr. A. H. Merritt was read, and the recommendation on motion adopted:

To the National Dental Association:

Tuberculosis is an infectious, communicable disease affecting all ages, but especially those in early adult life. It causes more deaths than any other disease except pneumonia, and a far greater portion of invalidity than any. In its early stages it is curable. It is preventable.

Experience has shown that the only hope in controlling tuberculosis is in the adoption of intelligent, comprehensive, and wise prophylactic measures. The keynote of the crusade is *prevention.* To control the disease the roots of the evil must be touched.

There is direct dependence in tuberculosis upon debility, diseases which have reduced the body's resistance, and malnutrition. In the prevention and treatment of the "great white plague," nutrition is of the first importance. Nutrition is dependent upon complete mastication; thorough mastication depends upon good and useful teeth. Well-cared-for teeth and a clean mouth help to prevent tuberculosis.

The dental profession has its place, and an important work to perform, in the crusade against tuberculosis. It is a work which is peculiarly its own; it is of the very first and foremost importance.

Therefore it is the express desire of this association to put itself on record as in active participation in the organized work which is carried on. And it is also our express desire to have presented before the International Congress on Tuberculosis at Washington this

official action of the National Dental Association.

The following letter from Dr. E. Sauvez was received and ordered read at the general sessions:

PARIS, June 25, 1908.

Mr. President and dear Colleague,—I send you herewith the program of the session which will be held by the F. D. I. at Brussels on August 6, 7, 8, and 9, 1908.

I would like to call the attention of the members of your society to our present program, with a view to interesting them in the International Congress which will be held in Berlin next year. I hope you will be one of us in Brussels, and that you will invite the members of your society who can do so to attend.

Believe me, Mr. President, etc.,

E. SAUVEZ, *Vice-president.*
(For the president.)

On motion, orders were directed to be drawn to pay all duly audited bills, and also for the allowance to the Secretary and Treasurer.

The resignations of Drs. Henry Barnes, C. M. Bailey, A. R. Owre, and S. C. G. Watkins were accepted. T. F. Gifford was ordered dropped from the roll. Mrs. Emma Eames Chase's name was restored to the roll, and on motion she was made a member without dues.

On motion, Dr. Vincenzo Guerini, Naples, Italy, was unanimously elected an honorary member of the association.

The following report of the Auditing Committee was accepted:

REPORT OF THE AUDITING COMMITTEE.

Your committee respectfully report that they have examined the Treasurer's accounts and all bills presented, and have approved the same.

V. H. JACKSON,
H. B. MCFADDEN,
M. F. FINLEY,
Auditing Committee.

REPORT OF THE COMMITTEE ON CLINICS.

I. PRELIMINARY REPORT.

UPON receiving notification from the secretary of my appointment as chairman of the Clinic Committee, I mailed my acceptance and proceeded to seek for members who should be capable of assistance in so great an undertaking. In the western territory, with which I was the least familiar, I failed in finding helpers. Dr. Wedelstaedt, and in succession Dr. W. N. Murray, declined to serve upon the committee, and I finally concluded to follow out a plan of my own, for the success of which reference may be had to the clinic program. I wrote to thirty-one secretaries of the different state societies asking them for lists of names of members who would be available as clinicians. I received the courtesy of eighteen replies, the remaining thirteen failing to even acknowledge the request. If any state society is not represented upon the clinic program of 1908 it is because some of the secretaries failed in duty, and I had no other way of obtaining clinicians except through a national reputation or personal acquaintance. The rest of the committee notified, with the exception of Dr. N. T. Shields of New York, responded to my invitation to look after the clinics in other sections of the country, and receive my hearty thanks for their co-operation. The gentlemen who finally assisted me were as follows:

For Maine, New Hampshire, and Vermont—Dr. A. J. Sawyer, Manchester, N. H.

For Massachusetts—Dr. G. C. Ainsworth, Boston, Mass.

For Rhode Island—Dr. Carl R. Lindstrom, Boston, Mass.

For Connecticut—Dr. Ned. A. Stanley, New Bedford, Mass.

For New York, New Jersey, and Delaware—Dr. C. E. Parkhurst, Somerville, Mass.

For Pennsylvania—Dr. H. B. McFadden, Philadelphia, Pa.

For Maryland and District of Columbia—Dr. Clarence J. Grieves, Baltimore, Md.

For Middle, South, and Southern Atlantic States—Dr. F. W. Stiff, Richmond, Va.

To each one of these I sent a sufficient number of printed invitations and return slips

to cover the sections represented. I sent out personally four hundred invitations through the West, and received ninety-five answers, a third of which were acceptances. By the first of March returns began to be received, which by the middle of June resulted in a clinic that satisfied the efforts put forth by the committee. This clinic presents a varied program, with one hundred and sixty-three at the chair and table. These are divided into fifty-nine chair, one hundred fifty-five table, and eight surgical clinics, beside six special laboratory exhibits.

The profession have been kept posted with regard to the clinic program through the May, June, and July issues of three of the dental magazines. The correspondence has been no small item in the work of the chairman, over two hundred personal letters having been written.

Tufts Dental College has been generous in offering its dental infirmary, laboratory, and amphitheatre for the clinics and exhibits. These rooms with their equipments are unsurpassed in excellence for the operations in hand.

To the college and to local members of the clinic committee I return many thanks for all the assistance given.

My first experience in arranging an N. D. A. clinic is at an end. There have been mistakes made and lessons learned, but the result averages a good showing.

Respectfully submitted,

GEO. E. SAVAGE,
Chairman of the Clinic Section.

II. LATER REPORT.

The days of July 29 and 30, 1908, will be memorable in the history of the N. D. A. clinics. It is the consensus of opinion that the clinic of 1908 was one of the best ever held, both in breadth of program presented and in large attendance.

At an early hour Tufts College was in readiness for visitors and practitioners. The visitors began to gather at the scheduled time, but a large number of clinicians were late at their posts of duty, causing somewhat of a congestion, which would have been avoided had every man been in his place at the time appointed.

The infirmary, where the chair clinics were held, presented a lively appearance with its bevy of workers, patients, and visitors, and those who were fortunate enough to find a place of observation were amply repaid for being there. Some of the clinicians appearing upon the program were "unavoidably detained," which often happens, but of the one hundred and sixty-five clinics mentioned, more than one hundred and forty were in operation. Of these there was a marked increase of operations along the line of prevention, twenty-seven being of strictly preventive character. This increase—so says Dr. A. J. Flanagan in the *Springfield Republican* of August 30th—demonstrates the fact that dental as well as medical science has turned the tide of remedy from curing to prevention.

The laboratory of the prosthetic department of the college was thronged with those interested in the table clinics. Here the casting of gold inlays, the X ray in dentistry, cases of crown and bridge work, orthodontia —in fact, all subjects relating to dentistry —were in process of demonstration.

The amphitheatre of the college was the center of attraction for the man interested in oral surgery. The lectures and operations of Dr. W. E. Chenery of Boston were by far the leading ones in interest to the dentist. He demonstrated the various methods of removing adenoids and tonsils. Ten cases were operated upon each day, his demonstrations showing adenoids as one of the most important factors in causing malformation of the face and teeth.

Dr. Charles D. Fillebrown operated upon a cleft-palate patient, and so added to the worth of the surgical clinics.

Not only did the clinic program include operations of the various sections relating more closely to dentistry, but there were also laboratory exhibits which were worth special attention.

As I have previously stated, the N. D. A. clinic was carried out upon broad lines, but to do justice to the many clinics worthy of note, a person should be appointed whose special duty should be to witness operations with a view to reporting for the Transactions. It is a herculean task for a chairman of a clinic committee to add the rôle of reporter

to his duties, hence but few details are given in this report.

To the faculty of Tufts College, who so generously opened its doors and spared no effort in making the meeting-place of the National Dental Association all that could be desired, I wish to return most hearty thanks.

For the valuable aid of Dr. Chas. E. Parkhurst and Dr. Carl R. Lindstrom of Boston during the two days' clinic, I am deeply grateful.

To one and all who in any way assisted in making the clinic section of this great meeting a success, I give my word of appreciation.

Respectfully submitted,

GEO. E. SAVAGE,

Chairman of the Clinic Section.

WORCESTER, MASS., September 1, 1908.

The Credentials Committee presented its report as follows:

REPORT OF THE COMMITTEE ON CREDENTIALS.

Army Dental Corps—Ralph W. Waddell, Fort Slocum, N. Y.

Connecticut State Dental Society—E. R. Bryant, New Haven. L. L. Beach, Bristol. E. S. Gaylord, New Haven. A. J. Cutting, Southington, Conn.

California State Dental Society—James G. Sharp, San Francisco.

Delaware State Dental Society—C. J. Kinkead, Wilmington. G. A. Hitch, Laurel.

Georgia State Dental Society—Joseph D. Eby, Atlanta.

Louisiana State Dental Society—A. Louis Ducasse, New Orleans.

Massachusetts State Dental Society—Samuel A. Hopkins, Boston. Amos I. Hadley, Boston. Gurdon R. MacKay, Boston. Roy A. Bush, Worcester. William H. Mann, New Bedford. Benjamin H. Codman, Boston. James R. Piper, Boston. Joseph T. Paul, Boston. Arthur W. Doubleday, Boston. George C. Ainsworth, Boston. Marion L. Woodward, Boston. Charles W. Berry, West Somerville. Paul G. White, Boston. William P. Cooke, Boston. Edgar O. Kinsman, Cambridge. William F. Gilman, Worcester. George T. Baker, Boston. Alice M. Steeves, Boston. Albert B. Jewell, Newton. Timothy O. Loveland, Boston. Howard Clapp, Boston. Frank T. Taylor, Boston. Thomas J. Barrett, Worcester. William W. Marvel, Fall River. Edwin N. Kent, Brookline. Charles F. Kreppel, Forest Hills. George E. Mitchell, Haverhill. Edward P. White, Cambridge. Horace L. Howe, Boston. Carl R. Lindstrom, Boston. Andrew J. Flanagan, Springfield. Harry B. Sherman, Boston, Mass.

Maine State Dental Society—T. E. Tibbetts, Rockland. W. S. Fogg, Cornish. H. A. Kelley, Portland. A. J. Walker, Bridgeton. I. E. Pendleton, Lewiston. W. R. Bibber, Eastport.

Minnesota State Dental Society—E. S. Sweeney, Osakis.

Missouri State Dental Society—Richard Summa, St. Louis.

Maryland State Dental Society—E. E. Cruzen, Baltimore.

Michigan State Dental Society—James W. Lyons, Jackson.

Nebraska State Dental Society—A. H. Hipple, Omaha. W. L. Smith, Geneva.

New York State Dental Society—John H. Meyer, New York city. George S. Allen, New York city. Karl C. Smith, New York city. George B. Palmer, New York city. A. H. Merritt, New York city. Charles C. Linton, New York city. Alexander Currie, New York city. William Cummings Fisher, New York city. Wilber M. Dailey, New York city. F. A. Ballachey, Buffalo. Daniel A. Fuller, Brooklyn.

Nova Scotia State Dental Association—George K. Thomson, Halifax. Marion C. Oxner, Halifax.

New Brunswick State Dental Society—Frank A. Godsoe, St. John.

Ohio State Dental Society—W. O. Hurlick, Cincinnati. H. M. Semans, Columbus. W. T. Jackman, Cleveland. Arthur I. Brown, Cleveland. A. O. Ross, Columbus. Dewey Duane Smith, Sandusky.

Pennsylvania State Dental Society—H. C. Register, Philadelphia. Alfred P. Lee, Philadelphia. Victor Cochran, Philadelphia. J. F. Biddle, Pittsburg. Fred A. Peeso, Philadelphia.

REPORT OF THE TREASURER.

RECEIPTS.

1907.		
July 30th—		
Balance on hand from last statement	$989.16	
Received—Dues to July 16, 1908	2,055.00	
" " from Southern Branch	222.00	
1908.		
January 13th—		
A. H. Peck, cash return (slip-joint handpiece)	16.50	
		$3,282.66

DISBURSEMENTS.

A. R. Melendy, salary and sundries	$206.99	
W. R. Clack, expenses of clinics	189.31	
Wm. F. Finley, expenses of Committee on Army and Navy Dental Legislation	39.00	
E. P. Dameron, expenses Section I	10.00	
Chas. McManus, " Committee on History	25.00	
Chas. S. Butler, " and salary	689.02	
Burton Lee Thorpe, " Corresponding Secretary	26.32	
J. D. Patterson, expenses chairman Executive Committee	5.00	
Forward	$1,190.64	$3,282.66
D. O. M. LeCron, expenses chairman Section II	14.50	
A. H. Peck, for slip-joint and handpiece stolen	16.50	
J. P. Corley, expenses Committee on Hygiene	36.50	
1907.		
November 20th—		
H. J. Burkhart, expenses Executive Council	27.00	
November 25th—		
B. Holly Smith, expenses Executive Council	14.50	
F. S. Yeager, " Clinic Committee	2.50	
1908.		
March 30th—		
Wms. Donnally, expenses Legislative Committee	200.00	
		$1,502.14
Balance incidental fund, July 16, 1908		$1,780.52
Special fund for Dental Journal, with interest	$483.92	
Special Relief Fund, with interest	4,068.95	
		4,552.87
Total		$6,333.39

Approved: V. H. Jackson,
H. B. McFadden,
M. F. Finley,
Auditing Committee.

Respectfully submitted,

A. R. Melendy, *Treasurer.*

Rhode Island State Dental Society—James E. Power, Providence. Nathan A. Estes, Newport.

Texas State Dental Society—P. L. Knapp, Houston.

Vermont State Dental Society—J. A. Pierson, Barton. E. W. Knight, Bellows Falls.

Virginia State Dental Society—W. A. McGehee, Richmond.

The Treasurer's annual report was received. (See opposite page.)

The Executive Committee presented the following report, which was accepted:

REPORT OF THE EXECUTIVE COMMITTEE.

BOSTON, July 30, 1908.

A meeting of the Executive Committee of the National Dental Association was held at Hotel Somerset.

The committee was called to order by the chairman, Dr. J. D. Patterson.

On motion by Dr. Finley the present officers, Dr. J. D. Patterson, chairman, and Dr. C. M. Work, secretary, were elected for the ensuing year.

The following arrangement of the members into the various sub-committees was made:

Division I (*Arrangements*)—J. D. Patterson, C. M. Work, C. J. Grieves, and L. Meisburger.

Division II (*Credentials and Auditing*)—V. H. Jackson, M. F. Finley, and H. B. McFadden.

Division III (*Voluntary Essays*)—F. B. Kremer and T. P. Hinman.

C. M. WORK, *Sec'y.*

There being no further business, the Council adjourned to meet at Hotel Schenley, Pittsburg, Pa., October 10, at 4 P.M.

CHARLES S. BUTLER, *Secretary.*

President's Address.

By WM. CARR, M.D., D.D.S.

IT affords me great pleasure to have this opportunity to address the members of this association, composed of representatives of the dental profession from all parts of the United States. I desire to express my appreciation of the great honor that you have conferred upon me by electing me to this position, the highest which our profession has to give, and I keenly feel the inherent responsibility.

Our environment is particularly fortunate. We meet amid the historic scenes of our country's birth, within the shade of Old South Church, Faneuil Hall, Bunker Hill, and other monuments of colonial times, while near at hand are the venerable buildings of Harvard University. We are in a famous center of educational and professional culture, a city adorned by the names of Whittier, Holmes, Lowell, Longfellow, and others celebrated in American literature.

Inspired by our surroundings, we would seriously consider what is best and most necessary for the advancement of our profession. The memory of Flagg, Tucker, Fillebrown, Hitchcock, and many other able men who claimed this city as their home, should be an incentive to us; and their bright examples should give us renewed energy in our efforts to raise the standard of our profession throughout the country, thereby dignifying our chosen calling.

As we note and realize the improvements which have been made in this historic town since the days of the patriot fathers, we are reminded of the giant strides which have been made in our own profession. Dentistry has been revolutionized in every department. Prosthesis has been carried to a point which would have been considered impossible even twenty years ago. Artificial dentures are now being constructed which in shape, color, size, and adaptability would have been thought marvelous in the days when John Greenwood carved the set of ivory teeth for George Washington—a set that was the marvel of his time. At no time in the history of the world has our profession been able to render such valuable and effective service for the benefit of humanity, and at no time has so much been required of it as at the present. Oral hygiene and prophylaxis are now exciting lively interest among the laity. Educators throughout the country are giving instruction in these subjects, realizing their importance; and measures are being taken in the public schools for the enforcement of hygienic habits.

In addition to widening our knowledge of hygiene, we have made extraordinary

progress in bacteriology, in pathology, and in therapeutical and physiological materia medica, so that it may well come to pass that dentistry, instead of being purely surgical and mechanical, may in the near future become remedial as well. Dentistry is nobly keeping pace with general surgery and medicine, and we should not falter in our upward course. We have demonstrated in many ways that we are a liberal profession. Throughout the country, clinics are being held in many hospital wards and free infirmaries, and young men everywhere are demonstrating their willingness to devote their time to the relief of suffering humanity. I trust that this matter may be seriously taken up by the members of the profession in states where it has possibly received but little attention previously, and I hope that this movement may grow in strength in every part of our country, and that we as a profession may devote our time and labor to the amelioration of the condition of the suffering poor.

INTERCHANGE OF LICENSE.

Among the matters which appear to be of vital importance to us at the present time is the problem of state interchange of license.

Is it right that a practitioner who has spent years in practicing his profession, who has gathered a *clientèle*, and has gained the respect and confidence of the community in which he has lived, if forced to leave the state on account of ill health, family affairs, or other reasons, should be compelled in his new home, at an age when it would, perhaps, be difficult for him to again fulfil his early requirements, to pass a state board examination, designed to test the knowledge of the young graduate who comes fresh from the halls of his alma mater? How many of us, gentlemen, do you think, could pass a state board examination today without preparation? The possibility of a state interchange of license must primarily depend upon a uniform preliminary standard of education throughout the states. This standard should be no lower than the highest now maintained by any state, *i.e.* that of the state of New York, which requires a four years' course in a registered high school, or evidence of an equivalent preliminary education.

I believe that every matriculant for the dental degree should possess the preliminary education stated above; and as the regents of the University of the State of New York will hold examinations in any state of the union upon the request of three students, it would be well to recognize them in the future as the proper arbiters of the standard of preliminary education, at least until such time as the other states establish their own boards of regents, when of course they could hold their own examinations.

Today college curricula and state-board examinations are practically the same throughout the union, although the methods of examination may vary somewhat; and if the standard of preliminary education were made uniform, the unification of all standards would be accomplished, and state interchange of license would simply be a matter of detail. The good effect of this upon the profession generally could in my opinion not be overestimated, for a professional man possessing a standard preliminary and professional education should not be debarred from practice in any state when he has once qualified as a practitioner in another. This matter is one which

concerns us all, and it can be accomplished if the members of this association will put their shoulders to the wheel in an endeavor to secure such legislation in their respective states that the standard of preliminary education may be made to conform to that of New York.

The necessary suggestions for the amendment and codification of existing dental laws might proceed from the National Association, whose recommendations state and local societies should endeavor to have embodied in their statutes.

With this suggestion in effect, an applicant for license in any state would simply be obliged to show a certificate of registration and license in some other state if he would be admitted to practice.

ARMY AND NAVY LEGISLATION.

In regard to army and navy legislation, we are obliged to again report a further postponement of the desired reform. The bill presented by your committee passed the Senate, and action has been deferred in the House of Representatives, where the measure is still held in committee.

It is to be regretted that a bill under which the members of the dental profession now enrolled in both branches of the service would receive the same rank and recognition accorded at present to the medical staff, had not been officially prepared and presented to Congress with the unanimous approval and support of the association. I have been informed that it would be practically impossible to secure the favorable report of such a measure by any committee, unless the measure were approved by the War department and by the chief of the bureau of medicine and surgery of the navy. Before the adjournment of this meeting, a bill should be prepared and presented by the Committee on Army and Navy Legislation, in conference with the Executive Council, in order that it may be thoroughly discussed by the members present, and receive the indorsement of the entire association. This bill should then be submitted to the army and navy authorities for approval, amended, if necessary, to conform to their views, and with their indorsement should be presented to Congress as the official bill of the National Association. I believe that this procedure, if followed out, might secure the passage of the bill in the next Congress,—which did not adjourn *sine die,* and that the official bill could be substituted for the one in committee, and then passed by the Senate.

After this measure has received the indorsement of the association and the approval of the medical authorities at Washington, any interference or opposition on the part of any one or several members of this association should be severely censured.

MILLER MEMORIAL FUND.

During the last session of this association, news came to us of the untimely death of our fellow countryman, Dr. Miller. We must not be unmindful of the great achievements of this distinguished scientist, whose essays on the etiology of dental caries attracted the attention of scientific men throughout the world. As president of the International Dental Federation, he labored earnestly for the advancement of our profession. In evidence of the profound appreciation of his services, a Miller memorial fund has been organized. Several thousand dollars have already been placed into the treasury by other

countries—Germany has up to the present moment raised four thousand dollars, and England and France are doing well. New York State has promised one thousand, and I trust that a committee will be appointed by this association to cooperate with the committee in charge of this matter.

INCREASE IN MEMBERSHIP.

Another matter which well deserves careful consideration is the question of an increase in membership of this association. For a number of years there has been a disposition on the part of many members of the profession, whether connected with the National Association or not, to form a new national organization, on the ground that this association is narrow, and so limited in its membership that it does not fairly represent the dental profession of this country.

In other words, we have been accused of being a closed corporation; and when we consider the fact that our membership today is only in the neighborhood of seven hundred, whereas there are thirty-six thousand registered practitioners in the United States and between two and three thousand recent graduates who have not yet registered, it would seem that some measures should be taken to enlarge our membership by the admission of reputable members, truly representative of the profession. Some advocates of the new association have favored the open door and the indiscriminate admission of every legal practitioner who desires to become a member of the association. Such action would be dangerous in the extreme, as it would admit all licensed practitioners, many of whom, unfortunately, are not only unethical in regard to advertising their offices and in other ways, but who have procured licenses by fraud, thereby disgracing the profession and discrediting any association which would admit them to membership.

The desired increase could be obtained by amending the by-laws so as to admit every member of a state society or of a district or local society entitled to representation in a state society, upon presentation of a certificate to that effect from any state society, signed by its president and secretary. In this way, every ethical and reputable practitioner who desired to do so could attend the meetings of this association as a delegate and become a member, the state societies being responsible for the ethical and professional standing of the delegates presenting their certificates. Because of the improved curricula of our colleges and the more scientific methods of teaching now in vogue throughout the country, we are preparing and admitting to the profession young men whose minds are trained for scientific research, and who should be encouraged and brought into the association. These young men are well equipped for their professional life, and they should be induced to join the local societies, and then to become members of the National Association. Few applicants are now rejected by state boards, and the graduates are better prepared for their life-work, this being due to the thoroughness of the present methods of instruction as well as to a higher preliminary standard of education. The plan suggested would increase our membership, add to the usefulness of our society, strengthen our influence and power in the community, and at the same time conserve our ethical standing. After we have increased our membership, our meetings should be at

tended by seven thousand instead of the few hundreds who now attend each year.

JOURNAL OF THE NATIONAL DENTAL ASSOCIATION.

For years an effort has been made to establish a journal of the National Dental Association. Committees appointed to consider the matter have made voluminous and carefully prepared reports from time to time, but up to the present moment nothing has been accomplished to this end.

The time seems ripe for us to publish our own journal. There is no better way of accomplishing anything than by establishing a journal. We should take steps to publish our own at once, even if for a time it be published at a loss, though if conducted in a businesslike manner it would undoubtedly soon become an extremely valuable asset to the association, and pay its editorial staff remunerative salaries. There is, perhaps, no better model for us than the *Journal of the American Medical Association*. This journal today is one of the most highly-regarded advertising mediums among the members of the drug and allied trades, and space in its columns is eagerly sought and paid for at the highest rates. Besides the valuable additions to medical literature which its columns offer to the profession, the physician and surgeon can safely make use of every article, whether it be of an instrumental or medical nature, for no advertisement is ever accepted until samples of the article advertised, together with a copy of the proposed advertisement, and with the formula and clinical literature of the product, if it be of a medicinal character, have been submitted to the journal's medical council. An article or drug cannot be advertised in that journal without the indorsement of the council, to make sure that the article has the merits claimed for it. In addition to this, many articles are advertised which would not otherwise be brought to the attention of the profession by means of the "house journals," which will rarely accept advertisements of remedies or articles competing with the products of the firm financing the journal.

With an increased membership we should have an increased income, and I do not believe that the journal would be a burden. A permanent committee should be appointed to commence the work of establishing such a journal. This committee would secure much valuable assistance if it conferred with the management of the *Journal of the American Medical Association* in regard to the matter.

DENTAL POLITICS.

Another matter must be mentioned of which we hear a great deal, usually just before or during a meeting of the association, *i.e.* "dental politics." The so-called reformers are like the poor, they are always with us. We seldom, if ever, attend a meeting of the association without having to hear a hue and cry against politics and listening to the claim made that the association is ruled by a few.

Now, gentlemen, politics of a proper character is a wholesome and necessary part of every organization, whether it be national, state or local. No organization can exist without leaders, and without opposition every society would soon become inefficient, corrupt, and would no longer serve the best interests

of the profession which it claims to represent.

No set of men can rule a live organization for a long time if they are inefficient or corrupt—and if they are efficient and honest, why change? If, at any time, the leaders lack efficiency, become careless, and lose the confidence of their associates, the remedy is in your own hands. It is impossible for any set of politicians, whether dental or civil, to rule without the consent of the majority.

Criticisms have been made since our last meeting regarding the powers delegated to the Executive Council, and concerning their method of transacting business. Such criticisms are unjust and misleading to those who are not aware of the work performed by this body.

The greater part of the labor of your organization rests on the Executive Council; the conduct of the society's affairs between meetings is in its charge, and many times in the past it has shown its efficiency and devotion to your interests. The work of your committees has been handicapped in many instances by opposition, ostensibly based upon the plea that there was no quorum present at the last meeting of the Council, at which action was taken about conducting the business of the association *ad interim* of our meetings. That this has been the case at times in the past is due to the fact that the Council is composed of men residing in widely separated parts of the United States—this being necessary under the constitution, which provides for representation on the Council of every division of the association—and it has been an almost impossible task to secure the presence of a quorum in the city most accessible to all. The traveling expenses of the members render such meetings expensive, and if routine business were not transacted at the time and place mentioned in the notice of the meeting, it would necessitate a second or even additional meeting thereafter, the result in all probability being the same so far as the presence of a quorum is concerned. Technically speaking, a quorum is assumed to be present, unless the lack of a quorum is noted and the attention of the chair be called to this fact.

I would therefore suggest that the constitution be amended in such a manner as to provide that in future, immediately following the election of officers and prior to the adjournment of the association, the Executive Council shall hold an open meeting upon notice read to the association by the chair at the time of the election, at which meeting the Council shall organize, appoint committees, and transact whatever business may be properly before it.

The names of the members of the various committees should be announced to the association prior to adjournment, when necessary changes, due to declinations or to other causes, could be made, so that immediately after adjournment the committees, sections, chairmen of clinics, etc., could enter upon their duties, thereby saving much valuable time. By this method the Council would conclude its labors coincidently with the adjournment of the association, and such criticisms as have been heard in the past would no longer have even a seeming foundation. In addition to this, the association would save much money, which could be more profitably spent in other directions, by the abolition of the *ad interim* meeting of the Council, which is now such a heavy and unnecessary burden to the association, as well as to

the individual members of the Council.

RECOMMENDATIONS.

In accordance with the foregoing suggestions, I beg to offer to you the following recommendations for consideration and for such action as you may deem proper.

Clinics. I would recommend that the various state societies should be asked to encourage the organization of clinics in the hospitals of our cities for the care of the worthy poor. These clinics should be conducted upon scientific principles. In the case of children, charts should be kept recording the general condition, blood tests, condition of the mouth, etc., together with a record of the weight of the children when first coming under observation. The varying changes should be carefully noted from time to time while the children are under treatment, in order that the results of the treatment under various conditions may be kept on record for future reference. These clinics should be maintained by the volunteer efforts of the practitioners of the city in which they are established.

Interchange of license. I would recommend the adoption of the following resolution:

RESOLVED, That the National Dental Association, being convinced of the necessity of uniformity and codification of the existing laws regulating the practice of dentistry throughout the United States, requests the various state societies throughout the United States to secure from the legislatures of their respective states laws requiring that, in the future, matriculants for a dental degree in the various states shall either be graduates of a registered high school or establish by evidence that they have had a preliminary education equivalent to the high-school course. The president of each state society is hereby requested to report to the National Association prior to its next meeting what steps, if any, have been taken to this end, with the results attending such effort.

Army and navy legislation. I would recommend that the Committee on Army and Navy Legislation, in conference with the Executive Council, should prepare and present to this association for discussion and indorsement prior to its adjournment, a bill whereunder the members of the dental profession serving in both branches of the military service of the United States should receive the same rank and recognition now accorded to corresponding members of the medical staff.

It is also recommended that with the indorsement of the association this bill should be submitted for approval to the medical authorities of the War and Navy departments of the United States, and if approved by them, being amended, if necessary, to meet their views, it should then be substituted for the bill now in committee of the House of Representatives, and presented to be acted upon at the next session of Congress. This procedure having been adopted, any interference or opposition on the part of any individual or individuals, members of the association, will be severely censured.

Increased membership. I recommend that Article IV, Section 1, of the by-laws of this association be so amended as to admit to the meetings of this association as a delegate every member in good standing of a state society, or of a district or local society which is entitled to representation in a state society, upon presentation of a certificate of such membership, signed by the president and secretary of the state society.

Journal of the National Dental Association. I recommend that a permanent

committee of five members be appointed, with authority to establish the *Journal of the National Dental Association*, to arrange for its publication, appoint its editorial and business staff, and commence the publication of the journal at the earliest practicable moment. I would suggest that this committee confer with the management of the *Journal of the American Medical Association*, and I believe that much valuable assistance would result from such conference.

Executive Council. I would recommend that the constitution of the association be so amended as to provide that in future the Executive Council shall hold an open meeting immediately following the election of officers, notice of which meeting shall be read to the association by the chair at the time of the election, at which meeting the Council shall organize, appoint committees, and transact such other business as may be properly before it.

The names of the members of the various committees, etc., should be announced to the association prior to adjournment, in order that any necessary changes may be made. Immediately after adjournment, the committees, sections, chairman of clinics, etc., will be in position to enter upon their duties for the ensuing year.

Constitution and by-laws. I would recommend that as the present constitution and by-laws of this association are cumbersome and inadequate for the conduct of the affairs of a large association, a committee of three be appointed to revise the constitution and by-laws.

Gentlemen, in conclusion, I desire to express my sincere thanks to the chairmen, secretaries, and members of committees, sections, etc., for their hearty co-operation with me in preparing their work for presentation at this meeting. Without such assistance, no amount of individual effort on the part of your officers would produce results, and such success as we may have achieved is due to the efficient labors of your various committees.

I also desire to express my appreciation of the work of your secretary, whose indefatigable efforts have kept the business of his office in orderly motion, and whose report will show what he has accomplished.

The thanks of the association are due to the members of the Local Committee of Arrangements, for the efficient manner in which they have arranged for our personal comfort, and rendered possible the successful conduct of this meeting.

I would commend to your attention the papers which have been prepared and which will be presented at this meeting. Many of them are the result of original research, and all are well worthy of your serious consideration. These essays will be discussed by gentlemen eminent in the various departments, and as the papers have been in their hands for some time past, I feel confident that their efforts will add greatly to the literature of dentistry.

I trust that the work of this association will go on and increase in importance, and that in the near future we shall see a truly great National Association—not a new organization raised on the ruins of the old, but an association of natural growth, resulting from the needed and healthy increase of a vigorous and effective society.

Gentlemen, again I thank you for your support during the past year.

Pyorrhea Alveolaris—Its Treatment by Vaccines and Other Agents.

By TIMOTHY LEARY, M.D.

NEWER methods of treatment should be carefully applied in a large series of cases before definite conclusions are drawn as to their value. It is therefore my purpose to present at this time only a synopsis of the work which we are doing, and will continue to do, in the study of pyorrhea alveolaris.

The etiology of pyorrhea is hidden in obscurity, masked by general theories whose acceptance in great part by the dental profession has greatly interfered with the careful study along scientific lines of this really serious disease.

That the phenomena of pyorrhea are dependent upon infection is coming to be generally accepted. Whether infection arises only after the ground has been made ready through some diathetic influence must remain a question for the present. That infection is the dominant factor is evidenced by the transmission of the disease from husband to wife and by its tendency to occur in families. Our professor of clinical dentistry was associated in his student days with a dentist of the old school, whose custom it was to teach the young idea how to clean its teeth with pumice. He kept on his stand a pot of pumice with an orange-wood stick. He would scrub the teeth thoroughly, and then declare "That's the way to do it," at the same time triumphantly pushing the stick back into the pumice to await the next victim. As a result of his methods, his clients shed their teeth at about forty years of age, and so proud were they of this family trait that a local caste of toothless families was developed locally. The ability to produce pyorrhea in animals, such as rabbits, is a further evidence in this direction.

The joint at the junction of tooth and gum is one of the poorest pieces of mechanism in the body. This joint is protected under ordinary use from injury; but if it be injured, a good opportunity for infection is offered. In animals, cases of spontaneous pyorrhea have been described in monkeys and in the cow. In each of these cases particles of insoluble food material appear to have been the agents in favoring infection, and it is possible that similar conditions obtain in human beings. At any rate, within a short time of the establishment of the process in pyorrhea, if not before, the foreign body or irritant appears in the form of the so-called serumal calculus; a

pocket once established, conditions are ideal for bacterial growth.

Many organisms in themselves incapable of infecting the animal body are enabled to bring about disease conditions when introduced into the tissues together with a foreign body, such as a sterile splinter of wood.

It is therefore conceivable that organisms which are not looked upon as infectious to man may play a part in producing pyorrhea.

Bacteriological examination of smears from the pus of pyorrhea furnishes little that is conclusive. Bacteria abound in the discharge, but known pathogenic organisms are marked by their inconstancy. One case will furnish staphylococci, the next streptococci, the next pneumococci, the next perhaps all three, and the next none of the micro-organisms mentioned. Cultures show a similar variation in the pathogenic flora.

An almost constant finding, however, in smears from a large series of cases was the fusiform bacillus-spirillum, which combination was first described by Vincent. This combination is responsible for the production of Vincent's angina, marked by the formation of a dirty gray pseudo-membrane in the throat, unassociated with marked general symptoms. Such a membrane tends to form in individuals whose resistance is low, and whose pharyngeal mucosa shows anything in the way of ulceration. In several instances the organism has been found in fetid abscesses about the mouth.

Noma, or spreading gangrene, which arises most commonly about the mouth in children who are extremely debilitated, has been shown to be due to this combination by Weaver and Tunnicliffe of Chicago, as well as others. The dreaded hospital gangrene of the pre-antiseptic period has also been demonstrated to have been due to this bacterium—for it has been shown to be a single pleomorphous bacterium. The history of this organism, then, is that of a non-pathogenic or mildly pathogenic bacterium normally present in the mouth, which under unusual conditions, *i.e.* lowered resistance of the individual, is capable of producing the mild disease, Vincent's angina, or, if the resistance be lowered to the vanishing-point, the serious disease noma.

Lowering of resistance is not, however, the only factor. Exaltation of virulence of the bacterium is apparently an important element, since noma tends to occur in epidemics, the organism from an ugly case being able to attack and kill relatively robust children who are exposed to it.

The changes which the organism produces, a spreading gangrene, suggest on an expanded scale the spreading proclivities of pyorrhea, which have given it the name of "phagedenic pericementitis." Pyorrhea occurs, however, in normal human beings, whose resistance to the spread of this disease is marked by an inflammatory exudate rich in leucocytes, in contrast to the limited serous discharge, if any, which is opposed to the spread of noma by its helpless infantile antagonist.

Goadby and others who have worked on the bacteriology of pyorrhea have noted the occurrence of organisms of the Vincent type. Goadby is inclined to look upon the lactic acid bacilli which are present in the mouths of milk-drinkers as the causal agent in pyorrhea. The absence of pyorrhea in children, notably milk-drinkers, and its occurrence in adults, many of whom drink minimal quantities of milk, if any, make his findings very questionable. The demonstra-

tion of the Metchnikoff school, that lactic acid bacteria are not only not infecting agents in man but are capable of replacing pathogenic organisms which thrive in their absence in the intestine, is also a strong argument against his hypothesis.

The fact that the spirochæta or spirillum is found with much constancy in the normal mouth, and the further fact that it is cultivable only on blood or serum media under conditions of strict anaerobiosis, may have been partly responsible for the overshadowing of this organism in previous studies by the other bacteria, better known and readily cultivable in the air or ordinary media. The uniformity with which Vincent's bacterium occurred in smears from pyorrheal pus, not in small numbers but frequently predominating, led to a suspicion that it was an active factor in continuing the condition even if it did not play a part in initiating it.

Vincent has found that a combination of iodin, potassium iodid, and water, if applied in quantity to the lesions of Vincent's angina, brings about a rapid disappearance of the membrane.

We were therefore led to test its efficacy in the treatment of pyorrhea. The solution (iodin 1, potassium iodid 2, water 100) used in the laboratory in Gram's stain and also used in the sterilization of catgut, has remarkable penetrating properties, as shown in the use last referred to. It has also the advantage over other preparations of iodin, notably the tincture, of being comparatively non-irritant. It is essential, if results are to be obtained, that the pockets beneath the gums be first cleaned, and that any deposits of salts be thoroughly scaled away before the application of the solution. Moreover, it is necessary that the preparation be used frequently and in abundant quantity if we hope to keep the pockets clean.

Up to now we have daily treated a large series of cases with this preparation. The longest part of the process is the initial cleaning of the pockets of foreign bodies. After this has been done, the daily application of the IKI solution referred to requires but five to ten minutes. The results in uncomplicated cases of pyorrhea have been excellent, in that healing has been established in from two to four weeks of treatment.

It should, of course, be understood that we are not claiming priority in the use of iodin in the treatment of pyorrhea. Iodin has been used in this connection by the dental profession for many years, largely in the form of the tincture, usually applied at considerable intervals of time. The suggestion that iodin be used met with the response from our dental instructors that it had no value. Applied at least once daily, in the form which we have used, the results have been satisfactory and prompt.

This prompt response has had an additional interest as indicating the possible relationship of the infecting agent in pyorrhea to the micro-organism of Vincent's angina. Infectious processes in which pyogenic organisms are the offending agents do not respond in this way to iodin, nor do processes in which infection plays no part. We therefore look on the rapid reaction of pyorrheal processes to iodin as a further evidence that some organism of relatively limited resistance is the active agent in this disease.

In "ugly" cases where the disease had persisted for long periods, or where the process was general, or the discharge was very abundant, cultures have shown that pathogenic bacteria were present, often-

times in large quantities and apparently acting as secondary infecting agents. The Vincent organism is found in pathological conditions usually in association with other bacteria, often pyogens, and frequently with the diphtheria bacillus. In this class of cases we have therefore supplemented the treatment by bacterial vaccines according to the Wright method of inoculation. In most of our cases an autogenous vaccine from the pyorrheal pockets has been used. The organisms present were the streptococcus, pneumococcus, and staphylococcus, alone or in combination.

The combined treatment with IKI and vaccines has led to results perhaps more rapid in all cases than where the iodin was used alone. A small number of cases have been treated with vaccines alone, with very fair results.

Whether our results will have any permanence or not is a question which time alone can answer. The healing of retracted gums and the obliteration of pockets leaves a joint between gum and tooth less perfect even than it was originally. That such joints will remain free forever from infection is almost too much to expect. It is therefore improbable that we have established in any of our cases a permanent cure for pyorrhea. We have made more simple, we believe, its management, and ask further application of the methods by the dental profession.

We have made no references to the pathology of the process, which needs careful study. Opportunities of obtaining specimens from jaws, including the cavity walls which extend toward the roots, are not abundant in this country. It is hoped, however, that with a new source of supply material which has been recently opened, a detailed study of the pathology from autopsy specimens will be possible.

It is my expectation, with your permission, to report at later meetings the further results of our efforts.

Discussion.

Dr. S. A. Hopkins, Boston, Mass. I have been asked by Dr. Leary to say a few words on this paper. As might have been expected from so great a scientist, Dr. Leary has presented to us a tentative paper, expecting to make more positive statements when his experimentation has been carried farther. The scientific accuracy of everything that Dr. Leary has said cannot be doubted, but he has been modest in claiming little and showing just exactly what his experiments have guaranteed. There is one suggestion that I think may have another explanation than the one he has offered, namely, the possibility of infection from one member of a family to another. It has seemed to me that it is not so much the communication of the disease from one person to another that is responsible for this condition in several members of a family, but the fact that the members of the same family are subjected to the same conditions in life, the same food, and the same surroundings. Possibly this explanation may have some weight.

The Vincent's spirillum which he mentions is interesting to me because I have never been able to cultivate it, and I am glad to know that a method has been discovered by which it can be cultivated and by which investigation can be carried farther.

In connection with the possibility of this disease being an infectious disease, I wish to bring out just one other point. While there is room to believe that in-

fection, indeed, is concerned in the etiology of the disease, it seems to me that the primary conditions have largely been brought about by diet. We commonly find these cases among people who lead rather a life of luxury, without much exercise, and among people who chiefly follow a proteid diet. We also find this disease worse in winter than in summer, because the excretions of the skin seem to help the condition in the summer, and in many cases we may effect a relief by lowering the proteid intake, by exercise, and by promoting the functions of the kidneys and the skin. While it seems to me that the treatment suggested is most valuable, it must be administered in connection with a general treatment that will eliminate the poisonous products of proteid decomposition.

Dr. J. V. Conzett, Dubuque, Iowa. It is only because of the extreme importance of the subject and because it has been of the greatest interest to me in the past few years that I rise to discuss this paper.

First, I wish to most heartily commend the paper and congratulate the essayist upon the splendid work he is inaugurating.

But there are other symptoms of so-called pyorrhea, which may be termed primary phases of the disease, that must be recognized before we deal with pyorrhea itself. It is undoubtedly a fact that many teeth are lost before ever having reached the true pyorrheal stage. In such teeth there has been no infection, and the exfoliation of the teeth has occurred without a pus production, which is not true pyorrhea. The importance of recognizing the primary stages of the disease is therefore urged.

Dr. J. D. Patterson read to us a paper upon this disease some years ago that did very much to stimulate me in its study. I do not think that his work has received the recognition it deserves, for his experiments occupy an important place in the evolution of our thought upon this subject. You will remember his saying that in cases of gingivitis, where large doses of mercury or potassium iodid had been given, he had been able to cure the disease by simply cleansing the gingival margins, without leaving off the drugs. It is in this where the importance of Dr. Patterson's work lies. For, as he said, such cases can be cured, and further, gingivitis can be prevented during the exhibition of these drugs by a systematic cleansing of the affected parts. Dr. Patterson believed that his results were due to the removal of the filth that had accumulated about the teeth, and that the drug had nothing to do with the disease. In this I do not agree with him at all. The idea that pyorrhea is exclusively a disease of filth is to my mind utterly untenable.

Dr. Black in the "American System of Dentistry" speaks of a bundle of cells under the gingival margin partaking of glandular character, and Dr. F. B. Noyes has most convincingly demonstrated them in his article in the "American Text-book of Operative Dentistry."

These organs seem to be responsible for the elimination of the drugs in question, because of the peculiar anatomical structure of the parts by which the drug is held in contact with the tissues under the gum margin and is not thrown out, thereby causing an irritation and subsequent inflammation. I do not think that it is the elimination of the drug that causes the disturbance, but its retention under the gum margin after its excretion from the gingival organ. Therefore when nature is assisted by a cleansing of

these parts, the eliminated drug is removed, the cause of the irritation is taken away, and the inflammation subsides. An analogous condition seems to exist in every case of pyorrhea. By reason of some fault of metabolism some toxin or toxins excreted by the gingival organ are elaborated in the system, and, by reason of their retention under the gingival margins, set up an irritation and consequent inflammation. If we assist nature by cleansing these places no harm will result, but if, by reason of neglect, the process keeps on, we may sooner or later have an infection, with consequent pus-production, characterizing true pyorrhea. In many cases the teeth may be lost without any pus having formed, because there has been no infection. Only in cases where there has been infection and subsequent production of pus will Dr. Leary's treatment be beneficial. It may be very valuable if we are able to isolate the bacteria responsible for the trouble and then institute a technique that will enable us to use the opsonic method. I trust that Dr. Leary will continue his investigations, for we are to be congratulated upon having a man of his ability devoting his interest to this subject.

It is useless to combat an infection without first considering the etiological factor which has brought about such a weakened condition of the system as to allow the bacteria to become active. Clinical demonstration has assured us that the injection of certain vaccines raises the opsonic index to such an extent as to prevent and obliterate for the time being the activity of the infection. The best results from vaccines have been obtained by the use of mixed cultures.

We are accustomed to speak of pyorrhea alveolaris, thereby meaning a host of diseases. It is therefore very difficult to discuss this paper, which treats of morbid symptoms at the gingival border due to various predisposing causes. An intelligent discussion of this subject should be based on a condition due to one special predisposing cause. The remarks of Dr. Conzett on this subject are undoubtedly very valuable from the practical standpoint. Prophylactic measures are a very powerful means against the possibility of disease manifesting itself in the mouth or in some other part of the body rather than in the mouth itself.

Dr. M. L. Rhein, New York, N. Y. Dr. Leary's contribution to this subject is unquestionably of great value. There is, however, one point in it that seems to have evaded his attention. While listening carefully to what he said I have been impressed by the fact that he has studied this subject from a scientific standpoint and from observations collected. In regard to his statement that he has found it impossible to consult any literature on the pathology of this subject, I would like to call his attention to the fact that a very voluminous literature exists, mainly contributed by men in this country.

That a flow of pus from the alveolar margins can only be present if infection has produced it is an undeniable fact. The lack of vital resistance on the part of the patient is to my mind an important factor. The cause of that lack of resistance is the problem confronting every practitioner.

Dr. A. J. Flanagan, Springfield, Mass. I take the floor today believing that a certain practical and essential point is ripe for discussion. I wish to speak from the standpoint of the general practitioner and not from that of

the specialist. To my mind, the best practitioner of any profession is he that does most for humanity. This may seem a platitude, but we are almost daily confronted with a disease that some call pyorrhea, others interstitial gingivitis, others retrograde metamorphosis, analogous to osteomalacia. Dr. Leary has furnished us today with a most valuable aid for our practice. For some twenty years I have been attending dental and medical society meetings and have been associated with certain hospital corps, and I have seen what troubles arise from pyorrhea. Today, for the first time in twenty years, a man has appeared before an assembly of dental practitioners and has given us a very practical starting-point. The co-operation of men of scholarly and clinical ability, such as Dr. Leary represents, should sooner or later bring about positive results. I trust that in the near future we may have records and tabulations of such a nature that this "bane" of our calling—pyorrhea—will cease to be mysterious in regard to its pathology and treatment.

As Dr. Rhein has said, there is a predisposing cause for pyorrhea, and the average practitioner will do far better work if he is able to recognize the difference between predisposing and exciting causes. A knowledge of the vaccine treatment should supplement the clinical experience of the average practitioner. At some future meeting, patients should be presented by an expert who is able to state whether the case is one of true pyorrhea or not. Only then will we be able to do really scientific research work.

I wish to thank the association for presenting to us this subject in a new light, and Dr. Leary for elucidating the vaccine problem in its relation to dentistry.

Dr. J. D. Patterson, Kansas City, Mo. I have listened to the paper of Dr. Leary with great interest, having been interested in pyorrhea for a great many years and having studied the investigations on its pathology, etiology, and treatment. It would be very valuable if we could arrive at a definite conclusion as to the value of the vaccine treatment after the removal of all the irritants acting upon the roots. I am glad to see that Dr. Leary first of all removes these irritants. There are some men in our state who are treating this disease by the vaccine method, and they claim that it is not necessary to remove the deposits from the teeth. If Dr. Leary could prove to us that he is able to obtain a much more rapid cure by the introduction of vaccines after the instrumentation, he would indeed present us with a most interesting contribution. At present the fact remains that many men all over the country are effecting cures in less than two or three weeks of time, if the disease has not progressed too far, without the assistance of the vaccine treatment, merely by the adoption of measures that will keep the affected parts hygienic and sanitary after the surgical treatment.

I have been engaging in the treatment of pyorrhea for many years, and in regard to predisposition, I have come to believe that the reason why this disease is perpetuated in families is the hereditary type of tissue which exists in that family. We know very well that the type of tissue is handed down from father to son. We know that one tissue resists irritants remarkably well, and that in others the slightest irritation will start an inflammation. Slight deposits of calcic matter under the free margin of the gum of a patient will immediately produce irritation, while at the same time

vast amounts of calcic matter about the free margin of the gum may cause very little inconvenience. We are therefore led to believe that there is an hereditary type of tissue which is an important factor in the inception of the disease.

Like Dr. Rhein, I was very much surprised at the essayist saying that we have had no continuous and careful investigations on the pathology of this disease. My reading tells me that from the days of Hugenschmidt many authors in Europe and in our own country have entered into the study of the pathology of this disease with minute and scientific accuracy.

Reference has been made to some statements which I have made in former years regarding the influence of mercury. I found no difficulty in relieving gingivitis in cases of supposed mercurialism, and the speaker gave an explanation of why I arrived at a cure. We know that by mercury and potassium iodid the system is considerably disturbed; the condition of the blood becomes such that the tissue has a lessened resistance to any irritant, and it is more liable to yield to any attack. But I claimed then, and I claim now, that no case of gingivitis was ever due to that cause alone. I have had scores of cases sent to me with instructions that the patient was suffering from mercurial stomatitis, and have never failed to effect a positive cure in a short time, after all irritation was removed from the teeth and gums. I do not believe that any cases of pyorrhea are due to constitutional predisposition alone. I do not deny that predisposition has a great deal to do with the progress of the disease and the destruction of tissue, but without local irritation it is never present. There must be a dissolution of the gingival border about the cervix of the tooth before there is pyorrhea. I believe that pyorrhea is in the beginning essentially a filth disease. It is possible that vaccines are of some help to us in the treatment of this disease after it is established, and I am very glad that investigations are being carried on in this subject, but it seems to me that in order that the vaccine treatment be successful we must first find the specific micro-organism. I do not believe in the mixed serums. First we should find the specific micro-organism that causes pyorrhea and then we have some ground to work upon in securing vaccines for the cure of the disease. I have for many years carefully watched and tabulated hundreds of cases, and I find that no larger percentage of people who are treated for pyorrhea have constitutional predisposition than an equal number of patients who consult me for the ordinary operations of filling teeth. About ten or fifteen per cent. of the patients who are treated for pyorrhea have, according to my statistics, constitutional predisposition, and the people who come to me for teeth-fillings and other dental operations show just about the same percentage of predisposition—no more and no less. In fact, a great majority of the people who are treated by me for this disease are remarkably healthy and vigorous.

Dr. Leary (closing the discussion). I care to say but little in closing the discussion. I have undertaken this work because when I began to instruct students about pyorrhea I found that the etiology of the subject consisted in a series of rather hazy terms, such as uric acid diathesis and others, which were considered by the medical profession as obscure. As I said, I had difficulties in studying the pathology of the disease, and should be very glad if any member

would furnish me with literature giving a microscopical description of pyorrheal lesions. I have been unable to find any. I have found naked-eye pictures in abundance, some of which were exact and some were not. Not being a dentist myself, I am compelled to depend on the dental profession for opinions as to the efficacy of these measures. As a matter of fact I share the opinion of the men who have used the vaccine treatment in connection with local pyorrhea; not one of these men hesitates to say that he has never before obtained such rapid results.

As I said, this is really just the beginning of the study of this subject, and I hope that we will later on be able to present to you more definite and more complete data.

Tumors of the Mouth.

By H. H. GERMAIN, M.D.

THIS investigation deals with tumors of mesoblastic origin in the region of the mouth. Concerning the etiology of these neoplasms, nothing new is to be said. One is struck by the fact that trauma, in the broad sense of the word, plays some part in their causation. In sarcomata fully one-third of the cases present a history of trauma in some form. Whether this is simply a predisposing cause or not is, of course, a matter of opinion. It is surely a factor which, in many cases, must not be completely disregarded, and certainly up to date nothing has been definitely proved that would induce us to believe in the parasitic theory.

Such a large number of tumors in the mouth involve the bony framework that tumors developing from the bone have been taken as the basis for this paper.

The benign growths in the mouth are bone cysts, fibroma, osteoma, and enchondroma.

Bone cysts. These arise from some embryonic dental remains of mesoblastic origin. They usually appear in early adult life, are of slow growth, and expand the cortical bone, retaining a bony wall. This wall is thin in places and causes a characteristic crepitation when touched. These cysts have a fibrous wall with an epithelial lining, and are usually filled with clear fluid. It is to be carefully borne in mind that one cannot differentiate clinically between a bone cyst and any medullary growth having a bony wall, *i.e.* giant-cell medullary sarcoma. Hence it is best to advise surgical interference in any given case. These cysts are painless and are readily cured by removing the lining membrane. (*Cf.* cases 1, 2, and 3.)

Fibroma. This tumor may appear in the form of an epulis or as a tumor of the hard palate. It is painless and of very slow growth. When this neoplasm appears on the hard palate it is of the greatest importance to remember that the danger of hemorrhage must be avoided in its removal. Benign fibromata tend to recur unless they have been completely removed. (*Cf.* cases 4 and 5.)

The author has had no experience with enchondromas or exostoses of the jaws. These are benign growths which do not give rise to any symptoms, and are easily cured by local resection.

Sarcoma. Sarcoma in the mouth usually appears in connection with the bony framework. Occasionally we may have to deal with this tumor in the lip, tongue, or tonsil.

The giant-cell sarcoma is the most benign type, and may appear as a periosteal or as a central growth. In the latter case it expands the cortex, is of slow growth, and usually retains a bony wall for a long time. It is sometimes impossible to differentiate this growth from a benign bone cyst. Local subperiosteal resection usually suffices to cure the central type, while a wide excision is indicated in the periosteal. Of one hundred cases treated by local resection and curetting at the Johns Hopkins Hospital none have resulted fatally, and in a few only local recurrence occurred. The giant-cell sarcoma is the most common type of sarcomatous epulis. (*Cf.* cases 6 and 7.)

Osteo-sarcoma (*periosteal ossifying sarcoma*). According to Bloodgood of Baltimore, this is not uncommonly found in the lower jaw. It is a relatively benign growth. The more bone formation there is, the less malignant the tumor will be. By local resection Bloodgood has obtained cures in all cases. He lays stress on the differential diagnosis between this and the following conditions: syphilitic periostitis, exostosis, osteoma, and ossifying periostitis. The diagnosis is made by means of the X rays.

Myxo-chondro-sarcoma. This tumor has been observed in the antrum of Highmore. It is not very malignant and can be cured by local removal. Usually this is not followed by metastasis. (*Cf.* case 8.)

The more malignant sarcomata are the round-cell, spindle-cell, melanotic and angeio-sarcomata. These may arise in the medulla or be of periosteal origin. They grow with great rapidity, give rise to early metastasis and usually cause death within two years. As a rule, the younger the patient the more malignant the tumor. If the growth be of periosteal origin, pain is an early symptom; if it arises in the medulla, spontaneous fracture may be the symptom of its onset. In either case bone absorption is rapid, and a sign of malignancy.

In these cases, operative interference alone is of no value. Both local resection and extensive operative work are followed by rapid local recurrence and early metastasis. The treatment of choice in these cases must be a combination of methods, such as—(1) Local resection. (2) Use of Coley's toxins. (3) X-ray treatment. (4) Transfusion of normal blood.

It must, of course, be understood that sarcomata of all types become malignant if left untreated or treated by imperfect methods. Some of the less malignant types may undergo spontaneous cure, but this is so rare that it may be entirely disregarded. Tampering with neoplasms of any type is to be condemned. The extracting of a tooth from the base of an epulis may provoke malignancy and render a relatively benign tumor most dangerous. Partial removal or cauterization are to be avoided. In other words, the tumor must be either thoroughly removed or left alone. (*Cf.* cases 9–14.)

So much for the classification of tumors in the mouth according to cell types! It is now desirable to consider them with regard to their distribution.

Epulis. About half of such cases are benign granulomata, the other half representing sarcomata. Of the latter, the greater number are giant-cell sarcomata arising from the periosteum of the jaw or from the peridental membrane. Regardless of the cell type to which such a tumor belongs, thorough local removal by means of excision of the alveolus under the tumor is indicated. If

thoroughly removed, these tumors rarely recur or undergo metastasis. (*Cf.* cases 15–19.)

Lower jaw. Central giant-cell sarcoma is not malignant. Other cell types may be very dangerous. Any newgrowth with a tendency to bone-production is comparatively benign; but if, on the other hand, there be definite bone-destruction, the growth is very malignant. Recurrence may appear in the scar or along the course of the inferior dental nerve. In any event, local (if possible subperiosteal) resection through the mouth is indicated. By operating through the oral cavity there is less hemorrhage and no external scar. The possibility of metastasis must be considered in every case.

Upper jaw. Sarcomata arising in the antrum, unless composed of giant cells or myxo-sarcomata, are very malignant. Operative interference is much more serious than on the lower jaw, on account of shock, hemorrhage, and inhalation pneumonia. An external incision is necessary, and preliminary ligation of the external carotid is advisable. Wherever possible, an atypical resection should be performed, preserving the hard palate and the floor of the orbit. The necessity of this is obvious. Recurrence may take place locally or in the frontal sinus.

Anesthesia. The administration of an anesthetic by the ordinary methods is troublesome, because the cone is in the way of the operator. One may use Crile's method or give ether per rectum.

Cases.

(1) S. H., age forty-four; female. (Duration, some years.) Lower jaw: Dentigerous cyst; fibrous wall containing a tooth. Opened. Recovery.

(2) M. L., age nine; female. (Duration, six months.) Lower jaw: Bilateral cysts; both containing puriform fluid and teeth. Opened. Recovery.

(3) L. M., age sixteen; male. (Duration, six months.) Upper jaw: Dentigerous cyst, containing rudiments of tooth. Opened. Recovery.

(4) M. B., age fifty; female. (Duration, three years.) Hard palate—in the way of plate for artificial teeth: Fibroma. Excision. Recovery.

(5) E. C., age forty-five; female. (Duration, four years.) Hard palate—in the way of plate for artificial teeth: Fibroma. Excision. Recovery.

(6) M. P., age thirty-one; female. (Duration, five months; sympt., swelling.) Upper jaw: Giant-cell sarcoma. Resection. Recovery.

(7) P. R., age nine; female. (Duration, six months; sympt., swelling.) Lower jaw: Giant-cell sarcoma. Resection. Recovery.

(8) E. S., age eighteen; female. (Duration, one year; sympt., swelling.) Lower jaw: Endothelioma. Resection. Recovery.

(9) E. M., age thirty-eight; female. (Duration, two months; sympt., swelling.) Upper jaw: Round-cell sarcoma. Excision of upper jaw. Recovery.

(10) J. B., age thirty-six; male. (Duration, five months; sympt., pain.) Upper jaw: Spindle-cell sarcoma (recurrent). Resection. Probable recurrence.

(11) T. D., age thirty-four; male. (Duration, eleven weeks; sympt., pain.) Lower jaw: Spindle-cell sarcoma. Excision. Death from recurrence.

(12) L. L., age sixteen; female. (Duration, some months; sympt., difficulty in swallowing.) Upper jaw: Angeio-sarcoma. Excision. Recurrence.

(13) M. G., age sixteen; male. (Duration, four weeks; sympt., swelling and nosebleed.) Upper jaw: Round-cell sarcoma. Excision. Recurrence.

(14) M. McD., age thirty-four; female. (Duration, three months; sympt., swelling.) Lower jaw: Osteo-sarcoma, medullary. Resection. Recovery.

(15) A. S., age twenty; female. (Duration, one year; sympt., swelling; difficulty in chewing.) Lower jaw: Osteo-sarcoma, periosteal. Resection. Recovery.

(16) J. J., age six; male. (Duration, one year; sympt., swelling.) Lower jaw: Giant-cell sarcoma; epulis. Local resection. Recovery.

(17) E. B., age seven; female. (Duration, one year; sympt., swelling.) Lower jaw: Giant-cell sarcoma; epulis. Local resection. Recovery.

(18) R. B., age twenty-four; male. (Duration, one year; sympt., swelling.) Upper jaw: Giant-cell sarcoma; epulis. Local resection. Recovery.

(19) G. E., age twenty-two; female. (Duration, two years; sympt., swelling.) Lower jaw: Round-cell sarcoma; epulis. Local resection. Recovery.

Discussion.

Dr. M. I. Schamberg, New York, N. Y. When Dr. Germain's paper was handed to me yesterday with the request that I discuss it, I was impressed with the conservative manner in which he presents the subject and with the fact that he has not endeavored to say anything that is startling or sensational, for unfortunately, we too frequently encounter men working in this field who have observed something which they believe to be true and which they present prematurely to the profession. The essayist treats the subject of tumors in a manner that can only be of help to each one of us in determining the proper course which we should pursue in the treatment of these cases. In the first place, he very properly considers traumatism in a large number of cases of tumors of the mouth. Some of the injuries which the patient may receive may have no influence upon the growth of the tumor, and yet in many other instances these injuries stand in close relationship to the tumor. For that reason I would sound a note of caution in regard to the method of treating impacted molars; no attempt should be made to release by main force a tooth impacted in the jaw without first cutting down to the bone and properly releasing the tooth. One can readily understand that the force exerted in removing an impacted third molar is sufficient to cause in many cases an injury or accident. Furthermore, it is very important that the dental practitioner, who has an opportunity of seeing the patient's mouth long before the case is referred to the surgeon for diagnosis and operation, should realize that the lesions are presented to him in their incipiency, when most good can be accomplished through surgical intervention. The dentist has an opportunity to observe these lesions before they are dangerous. I have seen many cases—five at least during the last winter—that were gone too far to be benefited by surgical interference, which was largely due to the fact that the lesions did not resemble neoplasm, but had rather the appearance of ulcers of a chronic suppurative nature. In reality these lesions were cancers, and had they been examined earlier under the microscope, they would probably have yielded to thorough removal.

I can take exception to only one statement made in the essayist's paper, which I hope he will elucidate in the closing of the discussion, namely, the local removal of the growth. I merely speak of this because I wish to emphasize that in malignant cases the necessity for more than the removal of the local growth is indicated, particularly if this is malignant, and that every gland of the neck must be cleaned out, even though this operation

means reaching to the clavicle. Every portion of the lymphatic system involved must be removed before any fairly favorable prognosis of these cases can be given.

The essayist also referred to the field covered by the radiograph in the diagnosis of mouth-tumors. You all know that I have for some years been enthusiastic about the use of the radiograph in general dentistry and in oral surgery. I am pleased that our medical *confrères* are giving proper recognition to the dental causes of many tumors about the mouth, as is evidenced by Dr. Germain's paper; too much stress cannot be laid upon the value of the radiograph in differentiating between osteomyelitis, osteosarcoma, cystic degeneration of the inner structure of the mandible due to encysted teeth, and other lesions of the jaws and mouth.

Dr. A. G. Friedrichs, New Orleans, La. The removal of the superior and inferior maxillary bones would produce a considerable deformity of the mouth, constituting great inconvenience to the patient. I should like to ask the essayist if, in this method of procedure, he attempts to overcome the deformity by restoring the bones by means of a mechanical appliance?

The difficulty of making a differential diagnosis between tumors and diseases of specific origin was also of interest to me. In his paper the author made no mention of epithelioma, but confined himself to lesions of the bone. I merely mention this because in my hospital experience I have very frequently found tumors resulting from syphilis, similar to epitheliomatic and bone lesions. On account of the dulness of the patients, it was almost impossible to get sufficient historical data of the cases to make a correct diagnosis. I recall one particular case of epithelioma affecting the lip, the soft tissues, the tongue, and the floor of the mouth. The case had been under the care of a surgeon, who had concluded that the lesion had reached such a state that operative procedure would be of no value. In examining the case I accidentally discovered syphilitic symptoms in other portions of the body; the patient was put on specific treatment and was relieved.

I agree with the essayist in regard to the importance of an early recognition of these cases, and I indorse the method which he pursues in treating these conditions.

Dr. Germain (closing the discussion). One of the gentlemen brought up the question of cancer. I should just like to state my view on cancer—which is that cases of cancer should be operated on in two stages; in the first place, by cleaning out everything, and if necessary by tying the jugular vein and removing everything across the neck. This method has afforded me a fair degree of success, but I am not enthusiastic over the results, and have therefore refrained from mentioning it.

With reference to sarcomata, I believe that in the benign types local removal is sufficient, but in the malignant types I do not think it to be very beneficial.

In regard to differential diagnosis between syphilis of the mouth and sarcomata or cancer, I think that it is very often impossible to make a diagnosis from a section of the tissue examined under the microscope.

By saving the palate and suturing the tissues one may finally obtain in the upper jaw a base for the retention of a set of teeth.

SECTION I:

Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

Chairman—E. P. DAMERON, St. Louis, Mo.
Secretary—J. V. CONZETT, Dubuque, Iowa.

FIRST DAY—Tuesday, July 28th.

THE first meeting of Section I was called to order by the chairman, Dr. E. P. Dameron, at 2.30 o'clock Tuesday afternoon, July 28th.

The first order of business was the reading of a paper by Dr. F. A. PEESO, Philadelphia, Pa., entitled "Conservatism as an Ideal in Bridge-Work Restoration."

The paper here follows:

Conservatism as an Ideal in Bridge-Work Restorations.

By FRED A. PEESO.

I FEEL but little competent to deal adequately with the subject assigned to me—a subject of such great and vital importance, not only to the profession at large, but to the general public as well, to whom it is really of more vital significance than it is to ourselves.

Although I have worked and studied in this department of dental prosthesis for upward of a quarter of a century, nevertheless the conviction is more and more intensified in my mind that the unexplored regions of this subject are still greater than the whole territory which has been covered by the achievements of the present.

There are times when I feel completely discouraged by the realization of how little we really know and how much there is yet to be learned in this one branch. We are still working, as it were, in the early dawn, if not in the dark, and it is only by the hardest work and most earnest endeavor that we can hope to im-

prove and advance the results of our efforts to anything merely approaching perfection.

Crown and bridge work is a comparatively new addition to our professional activities. It is barely thirty years since it first demanded serious consideration, and for many years following it was frowned upon by the better members of the profession.

Unfortunately, at the beginning a large number of unprincipled practitioners saw in it a new source of revenue which they immediately proceeded to utilize, placing bridge work anywhere and everywhere, the only restriction to their operations being the inability of the patient to produce the necessary collateral.

Then, too, there were some really honest men who, carried away by the new idea and wishing to benefit their patients and perpetuate their names, did this work in ignorance of the relations of the mechanical stress involved and of the ability of the different teeth used as abutments to do the work imposed, with the result that the work became worthless after a short time.

This still further degraded this new art in the minds of the ethical dentists and of a large proportion of the more intelligent patients, to many of whom the mere knowledge of the fact that a dentist would advise bridge work was sufficient to stigmatize him with the suspicion of quackery.

A few of the better men had visions of great possibilities for the future of this work, and it is to their labor and their efforts that we are today indebted for the legitimate survival of one of the most important branches of dentistry.

There seems to be a natural tendency on the part of dentists to be over-enthusiastic over the advent of a new, or the resurrection of an old and forgotten idea or method.

When the use of amalgam was first introduced, the over-enthusiastic dentist hailed it as a panacea for the ravages of caries, under all circumstances and conditions. It was placed in cavities anywhere and everywhere. Perfect gold fillings were removed and in many instances all the fillings in a mouth were taken out and replaced with amalgam. This amalgam consisted of silver coin filed away, these filings being mixed with mercury. It was known as "Royal Mineral Succedaneum." Very little or nothing was known of amalgam, its manipulation, or its properties. The dentists simply knew that these silver filings mixed with mercury made a plastic mass that could be pressed into a cavity like putty, which, when left to itself became hard. As to whether it would shrink or expand, whether it would disintegrate readily, or as to what effect it might have on the tooth itself, little thought was given—and many practitioners cared nothing at all as long as the result brought them money.

With the introduction of vulcanite we had an analagous condition of affairs. While in itself of inestimable value to the profession, the introduction of vulcanite was in a way a great blow to high-class prosthesis, one from which the dental profession has never fully recovered. The delicate skill and manipulative ability which had been requisite in the making of metal dentures was not considered necessary in the use of vulcanite, and from skilled craftsmen many degenerated into mere workers in plastics, and became the medium through which quackery and incompetence expressed itself, to the great damage of

prosthetic art and to the detriment of dentistry in the public estimation.

Still later came the porcelain fillings or inlays, which were preceded by glass fillings. Many of you have probably spent time in powdering in a mortar differently colored bits of glass with which to experiment on these fillings.

The advent of the porcelain inlays was hailed with the same enthusiasm as the "Royal Mineral Succedaneum" had been, and it was in many instances followed with the same disastrous results. Gold was removed to give place to the porcelain inlay and many teeth were ruined.

The last of these innovations is the system of cast gold inlays and gold castings generally, while innumerable casting machines have been placed on the market, until it seems that the dentist who does not have some kind of original casting machine to sell is a sort of freak.

To quote the saying of an eminent sociologist in reference to another matter, "They have bred like wolves in a famine-stricken land."

This last idea of cast gold inlays is the most valuable of all that we have received for many years, and all honor is due to Dr. Taggart of Chicago, who has spent so many of the best years of his life in working out and bringing to perfection a method which will prove of such inestimable value to the profession. But even this method cannot escape the inevitable fate of all new ideas; it must first be run to the ground and killed. It will go through the same course as amalgam, porcelain, etc. It will be used everywhere to the detriment of the patient; but, like water, it will find its level, and then we shall more fully realize what a boon it is to both dentist and patient, and the name of Dr. Taggart will in years to come be revered as that of a benefactor to his profession.

It is crown and bridge work, however, with which we have to deal, and I shall endeavor to confine myself to my subject.

I have touched but lightly on its early history. It is only within a comparatively few years that crown and bridge work has been generally taken up, and at the present time its value as a most important factor is recognized by nearly every dentist.

It has passed through the fad stage, but, alas! it has not yet reached the point where it is a universal blessing to humanity—in fact, I really believe that it is directly the opposite, and that more harm than good is done by its use.

This is largely due to the mercenary spirit of practitioners who are still actuated only by the motive to get all they can from their patients, caring nothing at all as to whether the patient is benefited or not. There are also many failures among the honest practitioners, due almost wholly to their lack of knowledge and of understanding of the principles involved.

There is hardly any branch of dentistry which is so little understood at the present time as is crown and bridge work. It is one that requires a most careful and thorough study, and consideration of all existing conditions. Everything must be considered, and nothing left to chance. Not only local conditions, but the general condition of the patient, must be studied as well.

If the teeth are loose, why are they so? and can they, by proper treatment, be brought to a firm and healthy state? Is there any systemic condition which would predispose the patient to pyorrhea or to any disease which might affect the

teeth? If the teeth are abscessed or diseased in any way, they must first be brought to a healthy condition before we proceed with the mechanical part of the work.

NUMBER, POSITION, AND CONDITION OF ABUTMENTS.

In building a bridge over a river, the number, position and condition of the abutments are vital points for the life of the structure. If the abutments are built on an insecure foundation the structure will fall. If the foundation be all right, and the abutments are made to support one hundred tons, trouble is sure to arise if one thousand tons of weight be placed on the bridge. The same will happen if the number of abutments be insufficient; the whole work is wasted.

The same conditions apply to bridge-building operations in the mouth. The foundations must be perfect and proportioned to the stress which the bridge, when being used, imposes upon them, else you will see the structure collapse.

It does not make any difference how skilfully or how beautifully the prosthetic part of the work is done, the success of bridge work depends upon the fundamental preparation of the mouth.

RELATIVE STRENGTH OF TEETH.

The relative strength of the different teeth must also be considered. The canines and molars are the strongest and form the best abutments, but we cannot put the same amount of stress upon laterals, centrals, or bicuspids, although these teeth will do their proportionate share of the work.

A tooth properly treated will do far more work than it was originally intended to do, but we must not expect too much, or we shall regret it.

Two roots of equal stability used as abutments of a properly constructed bridge will successfully resist twice the stress of mastication which either root can bear individually, and when we come to multiply abutments the ratio in which these combinations of abutments resist the stress of mastication seems to increase proportionately.

Articulation is also of the greatest importance. The abutments of a bridge which otherwise might have lasted for many years may be completely ruined in a short time by a faulty occlusion.

The stress of mastication, which in some mouths is far greater than in others, must also be considered.

The shape of the arch, too, has a great deal to do with the lasting qualities of a bridge. A bridge in one mouth might last for years, while in another mouth, with exactly the same abutments and in equally good condition, but with a differently shaped arch, to place a bridge would be wholly inadvisable.

The fact that a bridge in contemplation would occlude with a plate would have a bearing on the utility of the work.

All of these things, and many more, must be conscientiously studied by the man who honestly desires to do the very best for his patients.

The lack of that success toward which all of us are striving is largely due to the lack of training in the fundamental principles. We must get at the root of things. We must understand the engineering principles upon which successful bridge work is of necessity founded, and be willing to study and work hard if we ever hope even to approach the ideal. Even then there may be failures, but if we are

honest at all times, such failures will be progressively fewer.

We cannot guarantee the success of our operations—nor have we any right to do so, any more than a physician can guarantee a cure; but if we have conscientiously studied our cases and have done the work to the very best of our ability, we shall at least have a clear conscience, even though our efforts may not have been crowned with success.

As I have said before, the success of bridge work depends primarily upon the preparation of the mouth, and of this preparation the shaping of the teeth and the fitting of the bands is a most important part. The lack of preparation and the subsequent evil results have been forced upon me many times. The teeth must be prepared so that the bands will hug the root at the neck tightly and cause no gingival irritation. If this be done, the chances of successful results in our efforts are very favorable, but if the preparation be faulty we have no one but ourselves to blame for our failures.

It is astonishing how much abuse the pericemental membrane will tolerate in some mouths and how little in others. Let me cite an illustration: A full upper bridge was placed in the mouth of a Chilian in May or June. In the lower right jaw the first molar and second bicuspid were missing, the first bicuspid and second molar being in position. The molar was slightly decayed, but was perfectly firm in its socket. The patient was obliged to leave the city and could not wait until the work was completed, so it was deferred until fall. While away the tooth troubled him slightly, and he thought he would have it crowned temporarily in order to keep it in good condition until the bridge was made later.

In October the patient returned to the city, and a most sorry condition of affairs existed. There had been practically no trimming of the tooth, the band had been forced over it, cutting into the gum and causing irritation and inflammation extending to the pericementum. The tooth was literally floating in pus, so that it was easily lifted out with the fingers. This result was entirely due to lack of preparation.

Another case, showing the opposite result, was as follows: The patient, an English lady, applied for treatment within the past few months. On her upper left first bicuspid a badly made gold shell crown had been fitted, which it was necessary to replace with another. On removing the crown it was found that the tooth had been trimmed very little, if at all. The band was impinging on the gum, which showed irritation.

On removing the crown it was found that the pulp-chamber had been opened and packed with cotton. There was a large perforation above the floor between the two roots. The pulps in both the buccal and palatal canals were alive and seemingly healthy. Notwithstanding these conditions, which had existed for three years, the root was quite firm. In most mouths a tooth treated as badly as this would have been lost after a few months at the longest.

Aside from the restoration of the masticatory functions by properly made bridges, and from the improvement of the patient's general health, the local therapeutic effect of the work upon loosened and diseased teeth is at times wonderful. Many times teeth which have become loosened from some cause such as malocclusion, from being without an antagonist, from carrying improperly designed

bridge work, from gingival irritation, etc., can be rendered perfectly firm by giving them work to do in carrying a properly designed and executed bridge.

Do not give up a tooth until you have exhausted every effort to save it!

One of the most remarkable cases of recuperation that I have observed was the following: The patient was a lady about forty years of age, whose teeth had been neglected; it was found necessary to place four bridges in her mouth. In the upper left jaw there was a very loose canine root, which had been improperly crowned; the crown had been lost for some time, and the root had broken and decayed away to nearly one-eighth of an inch above the gum, which was in a highly inflamed condition. In order to place a satisfactory bridge, it was necessary to save the root if possible.

The gum was pushed away and with difficulty a band was fitted to it. The root was so loose that in fitting the band a sharp-pointed instrument had to be passed up over and beyond it and stuck into the side of the root to prevent it from being pulled out while removing the band. A removable bridge was anchored to this and a molar, the band of the canine being nearly three-sixteenths of an inch deep, so as to bring it to the edge of the gum. The bridge was cemented in place, there being a space of about one-eighth of an inch between the face of the root and the floor of the cap filled with cement, the depth of the band making the facing short. This work was done a little over two years ago. The following fall the patient returned, and the condition of the mouth was found to be most satisfactory. The canine root had become nearly as firm as any tooth in the mouth. The irritation had entirely subsided, and the gums were perfectly healthy, but the reduction of the inflammation had left the band exposed about one-eighth of an inch or nearly to the face of the root. This was unsightly, therefore it was removed, and another band and crown, with a longer facing, was made and attached to the bridge, greatly improving the appearance. I saw the patient again about the first of July, when the mouth was in a perfectly healthy condition and the canine root as firm as any of the other teeth. This was a most unpromising case, but the result shows what can be done at times, even under the most adverse conditions.

I have mentioned these few cases to illustrate extreme conditions which we may at times be called upon to treat, and which we must treat to the best of our ability.

Sometimes we will be called upon to do some work against our judgment, as for instance when a patient, having an insufficient number of roots for a lasting bridge, is willing to resort to any expedient which will put off the wearing of a plate. In such an instance the dentist might take chances that he would not take otherwise, but he should have a perfect understanding with his patient as to his position regarding the durability of the work.

Bridge work unquestionably has proved to be a blessing to humanity—to both patients and dentists. To the profession it has been of inestimable value in that it has counteracted, to a great extent, the effects brought about by the use of vulcanite; for we are again becoming skilled in the working of precious metals, which for a time seemed a lost art, and today there are probably as many or more skilful gold workers among the dentists than there were before.

Bridge work must be regarded as a conservative measure; where it is indicated and when the work is properly done, it is the very best thing a dentist can do for his patient and nothing can fill its place; but in the reverse conditions it is the very worst thing, and nothing will ruin the mouth so quickly.

We must be conservative in all our dealings and our operations, and this we shall be if we are perfectly honest with ourselves; but there will always be dishonest men who will do anything if only they receive money for it.

We are all faddists to a certain extent, but we must not carry our fads to extremes. We can feel sympathy or even admiration for the honest and ignorant faddist, but we have only contempt for the dishonest, be he ignorant or wise.

Discussion.

Dr. D. J. McMillen, Kansas City, Mo. I have some very radical views on crown and bridge work. The paper, as you would expect from Dr. Peeso, is a good one. It gives us points of value in the practice of crown and bridge work. We may have many different ideas on this class of work, as it has been greatly abused and has done a great deal of harm as well as good. If carefully done there is nothing to take its place in dentistry, but to my mind it is seldom carefully done. We so often see this work where it should not be, and so much work that is so badly fitted that very serious conditions arise from it. In my career I have collected some two or three hundred specimens of bridge work from all over the country, from Boston to San Francisco, and it would surprise you to see the workmanship of some bridges, especially in cases where the teeth have come off together with the bridges. During the last ten or fifteen years I have offered a reward for anyone who would send me an accurately fitting crown after tooth and crown have come away together. I have a number of my own crowns, and there is not one in my collection that fits even approximately. I am willing to give ten dollars to any man who will send me an accurately fitting crown that has been worn in the mouth. I have often heard men say that they do fit these crowns accurately. I do bridge work to the best of my knowledge, and yet I doubt whether I ever fitted one accurately in my life. Nevertheless, we must do this class of work; we should do it as well as we can, and better than we have been doing it. I make this statement only in order to encourage the utmost care in its execution.

Dr. S. L. Rich, Nashville, Tenn. I have just one word to say, in opposition to Dr. McMillen's remarks. He says that of all those bridges that have come out of the mouth, containing the abutments, he has never seen one in which the bands were properly fitted. My answer to that is, that bridges which were properly fitted never come out of the mouth at all, and many of them have been buried with the persons whom they have faithfully served for so long.

Dr. Wm. Conrad, St. Louis, Mo. I am very sorry that I did not hear the paper, because I know it must have been a good one, but I wish to discuss Dr. McMillen's remarks. Now, there are lots of bands that are fitted perfectly; it is comparatively easy to fit them, and it is still easier to fit them sufficiently well to make a perfectly hygienic piece of

work. It is astonishing how much service even the most imperfectly fitting band renders to the patient. Bands should be narrow—the wider a band is, the harder it is to make it fit. My experience and my judgment prevent me from agreeing with Dr. McMillen. I should be sorry if there were so many unskilful dentists as he intimates. There are more dentists who make bands fit than those who do not.

In regard to the next gentleman's remarks, who made the statement that imperfectly fitted bands account for the falling out of the mouth of the specimens which Dr. McMillen has been collecting for years: It is not the imperfectly fitted band that causes the loss of a root of a tooth in a crown or bridge, but it is the *stress* that is brought to bear upon the tooth in the act of mastication. Bridges are principally lost owing to the force and stress which inevitably loosens the roots. As Dr. Crouse once said, you may start in practice and make a bridge for some old lady or gentleman who has had a great deal of trouble, and you may get a perfectly satisfactory result, and after three or four years they will be sending all of their old friends to you for the same kind of work. But in about another two, three, or four years, all these bridges that you have distributed will begin to come back to you in a loosened condition, and you will be requested to make them solid again. When these bridges are sent back to you you have just as much power to make them solid again as you have to cure a paralytic.

Dr. H. R. Jewett, Atlanta, Ga. I fully agree with the last speaker. There is one other feature, however, that I should like to bring up for discussion. One of the greatest evils that we have to contend with at present in crown and bridge work is the laboratory work done outside. The dentist sends the impression of a mouth to the laboratory stating that he wishes a bridge for that case. More trouble arises from that class of crown and bridge work than from any other with which we come in contact. The man who cannot make his own crowns and bridges cannot properly prepare the teeth for a crown or a bridge, nor can he place a crown or a bridge in position and prepare the teeth afterward. If he undertakes to prepare the teeth beforehand, and then sends the impression to an outside laboratory, the bridge ordered will resemble a ready-made suit of clothes; it will not fit.

Dr. C. W. Strang, Bridgeport, Conn. Most of us have seen exactly the same conditions as have been referred to this afternoon, and most of those failures occur in aged patients. A number of teeth are missing, and the teeth on which we depend for our abutments may be in fairly good condition at the time of the operation, but the stress to which they are subjected after the bridge has been constructed is sufficient to break the attachment of the abutments, and in a few years we find the bridge in a worthless condition. My experience has been that in nearly all cases where a patient has reached middle life we may do fairly good work. Even though the bands are not fitted absolutely perfectly, they will render fifteen or twenty or even more years of service.

Dr. Peeso (closing the discussion). I have very little to say in closing the discussion. There is a great deal of truth in what has been said by Dr. McMillen and by others. It is unquestionable that the bulk of the work that is put in the mouth is a detriment rather than a benefit, but this is largely due to

the improper preparation of the roots on which the crowns are placed. We must, of course, consider that we are building piers for a solid structure and that nothing must be omitted.

Articulation has been mentioned—one of the most important factors—and in bridge work we must reproduce as nearly normal conditions as we can. I do not know how long a bridge will last if it has been properly made, but I know of bridges that have been worn in the mouth for twenty or more years, and are rendering practically as good service today as when they were first inserted.

The next order of business was the reading of a paper by Dr. GEO. H. WILSON, Cleveland, Ohio, entitled "Some Phases of Construction of Complete Artificial dentures."

The paper here follows:

Some Phases of Construction of Complete Artificial Dentures.

By GEO. H. WILSON.

Two factors should always enter into the consideration of the construction of artificial dentures, the mechanical and the esthetic, and these in the order named. Mechanics is the basis of construction, and its perfection should ever be sought. However, if the operator is satisfied with mechanics, and limits himself to it, he is an artizan and entitled only to a meager compensation. If the skilled artizan to his proficiency adds esthetics he becomes an artist and is entitled to be ranked as a professional man and to receive the emoluments of his profession.

This paper is designed only to present certain phases of the mechanical arrangement of artificial teeth, and incidentally, by illustration, show some phases of their esthetics. It is designed to be a practical exposition of the chosen phases of the art rather than a disquisition on its science.

Orthodontists consider occlusion to be of fundamental importance in their art. Prosthetists should give consideration to this function, but should devote far more attention to that associated function (call it what you may) denoting action.

Unfortunately, prosthetic nomenclature has not been reduced to a science, so that it will be necessary to define and explain a few terms used in this paper.

Occlude—to shut: Applied to the teeth when the teeth of one jaw are in contact with the teeth of the opposing jaw, and at rest.

"Normal occlusion" is possible only with ideal arrangement of the teeth.

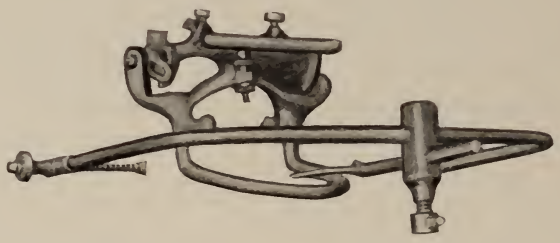
"Natural occlusion" indicates full closure with either normal or abnormal arrangement of the teeth.

Incisal, right and left lateral occlusion signify that the mandible has been carried in the direction indicated and the teeth are brought into contact.

Articulate—to join—from *articulus,* any kind of joint, either fixed or movable, that implies permanence. Thus, sounds are joined and form articulate words; arteries articulate; bones articulate; the phalanges of a finger articulate, but the phalanges of one finger can only touch or occlude with the phalanges of

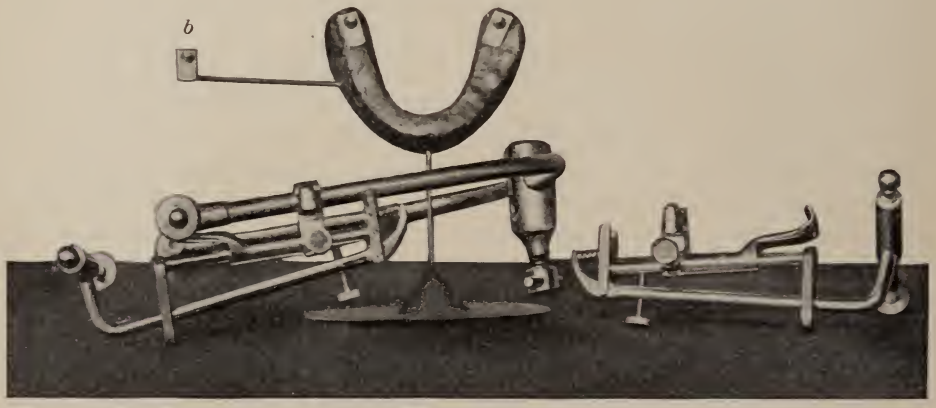
another finger, they cannot articulate; contiguous teeth in the arch articulate, but they only occlude with the teeth of the opposing arch.

Fig. 1.



"Articulator" is a proper name for the instrument upon which teeth are arranged; but the name, correctly speaking, refers only to the fact that the two arms of the frame are joined, not to the use to which the instrument is put. It would seem wise if the specific use of the term "articulator" were limited to those frames that more or less perfectly reproduce the mandibulo-glenoid joint, and that of "occluding frames" to those having a hinge joint.

Fig. 2.



Antagonize and *antagonization*—from the noun *antagonism,* "the state of being opposed; mutual opposition or resistance of counteracting forces, principles, things, or persons." This term well represents the thought to which we have erroneously applied the term articulation. It implies action, and the meeting of an opponent, to the best advantage, at every assumed position. The early editions of Richardson's "Mechanical Dentistry" use exclusively the term antagonism with its derivatives. The term will be adopted in this paper.

Proper antagonization of complete artificial dentures is of vast importance for both their retention and their use. Members of the profession have recognized the importance of this subject for many years, and much thought and energy has

been expended in developing and advocating the underlying principles. Too much commendation can hardly be given to Dr. Bonwill for his genius and persistent labor in improving prosthetics. It is regrettable that he did not recognize the importance of the angle of the condyle path. This meeting commemorates the forty-fourth anniversary of the meeting of the American Dental Association, at which Dr. Bonwill presented his "Anatomical Articulator." Had he recognized and developed the importance of the condyle path in addition to the splendid work which he accomplished, undoubtedly the reproduction of anatomical antagonism in artificial dentures would today be the rule rather than the exception. Because of the incompleteness of Dr. Bonwill's work, Dr. W. E. Walker of New Orleans and Professor Christensen of Denmark found fruitful fields for labor, and their names must be honored for the good work which these men have done. Great credit also is due to Dr. Geo. B. Snow for the practical application of the work of these scientists, which he has given to the profession in the "New Century Articulator Face Bow, and Bite Guides." These ap-

FIG. 3.

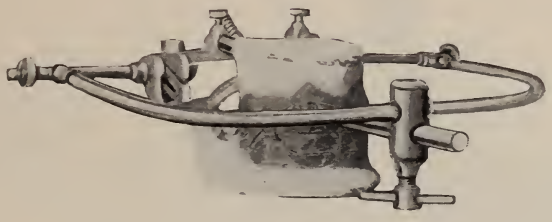
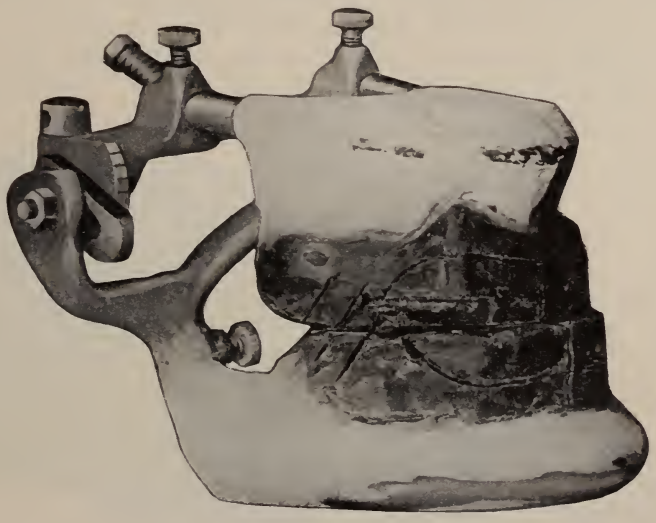


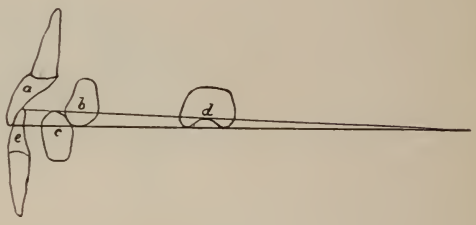
FIG. 4.



pliances are a necessity to every prosthetist if he desires to do work worthy of his calling.

Fig. 5.

Fig. 6.



It is not necessary to offer instruction in the use of these implements, because the information accompanies each outfit.

Fig. 7.

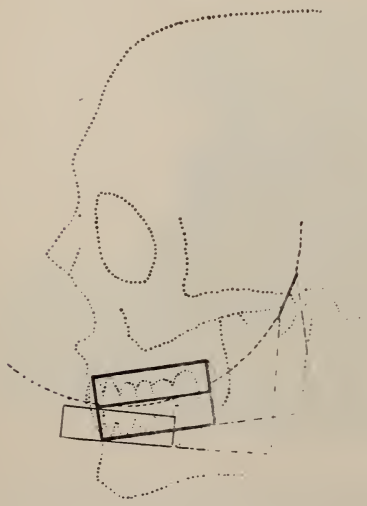


Fig. 8.

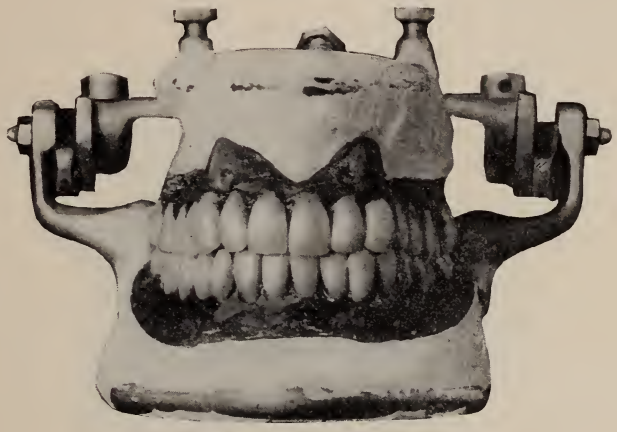
It may, however, be well to say that correct occluding and contouring models must be obtained, when the face bow will assist in establishing the relation between the mandibulo-glenoid joint and the upper cast, and the bite guides will record the condyle path.

This slide (Fig. 1) shows the New Century Articulator (Snow's) with the face bow resting in front of the articulator. The points of superiority of this articulator are—(1) The lower bow is adjustable in an up-and-down direction; a necessity for properly locating the casts. (2) The location and detachable features of the spring. (3) The high-

arched cross bar, permitting easy access to the lingual surfaces of the teeth. (4) The location and easy adjustment of the

The face bow is an indispensable adjunct for properly locating the upper cast upon the articulator. It consists of a

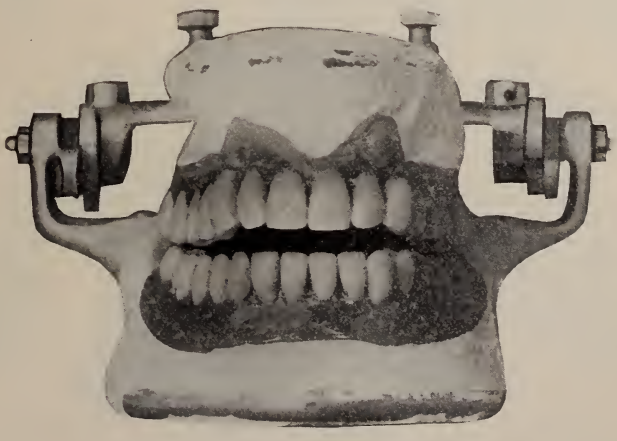
Fig. 9.



condyle path. Each bow is fastened with two set-screws. The instruments are nickel-plated, and are furnished either polished or unpolished. The experience

bow bar having at either end a sliding condyle bar and clamp nut. In the center of the bow bar is shown the double clamp holding the wax-model fork.

Fig. 10.

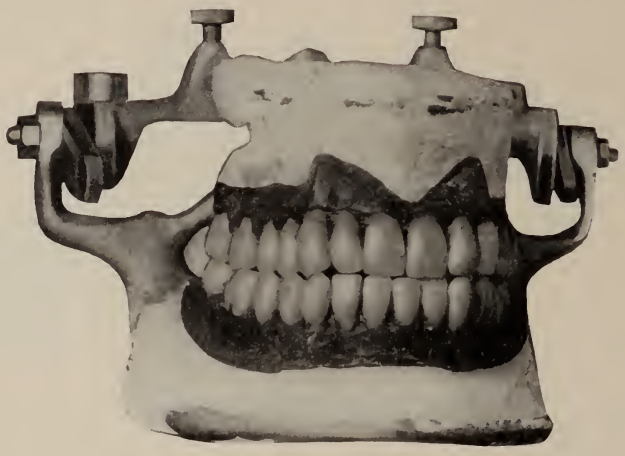


of the essayist is that the joints of the polished instrument work much more smoothly than those of the unpolished, so that it is well worth its higher price.

This slide (Fig. 2) shows the Snow face bow with the Prothero "face bow supporter" attached at one end. I do not know whether this instrument is to

be placed upon the market, but it should be, for while it is not indispensable it is a valuable assistant in placing the face bow. Diagram *b* shows a bite guide, and *c* shows the bite guides properly placed upon the lower occluding wax model.

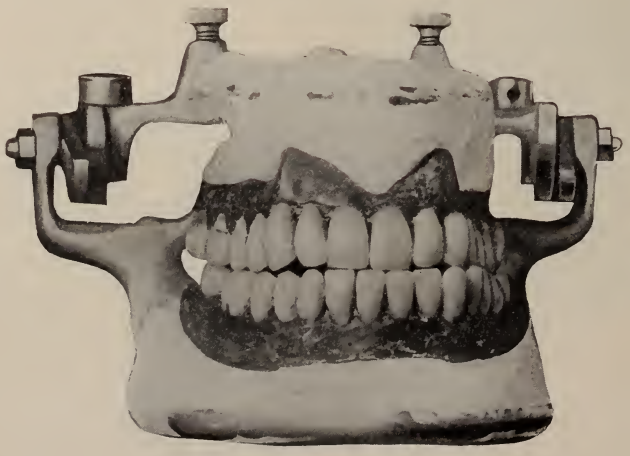
Fig. 11.



This slide (Fig. 3) shows the plaster casts, occluding and contouring wax models, and face bow mounted upon the articulator, in the retruded position or in normal occlusion. It is observable that the occluding plane is parallel with the lower bow. This position was made possible by the sliding up-and-down device of the lower bow.

This slide (Fig. 4) shows the case with the face bow removed, the retaining spring released, and the condyle clamps loosened. The bite guides have been replaced and the wax models closed in the

Fig. 12.



protruding position as registered in the mouth; this necessarily brings the condyle paths to the required inclination. The condyle clamps should be securely fastened, the bite guides removed, and the retaining spring hooked into place. The working casts and models are then mounted in the very best manner known to the science of prosthesis. The case is now ready for the mounting of the teeth.

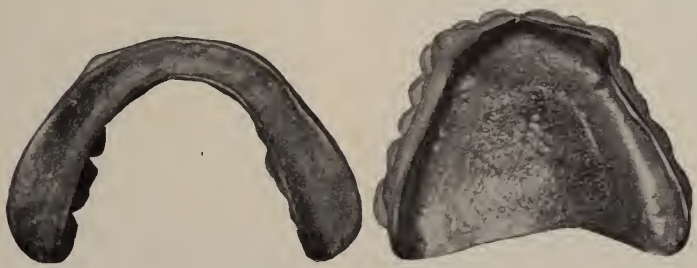
ANTAGONIZING COMPLETE ARTIFICIAL DENTURES.

The operation itself is purely a mechanical one, it has no esthetics; but the genius of the prosthetist may combine esthetics with the mechanical art. The antagonizing of complete dentures is a laboratory operation, and may be done by the mechanical man as well as or possibly better than by the operator; this

FIG. 13.

FIG. 14.

FIG. 15.



is, however, purely a question of the manipulative efficiency of the two men.

Fig. 16.

Fig. 17.

Fig. 18.

Fig. 19.

Either way, the patient may justly demand that his or her artificial denture shall be properly antagonized, because it is a product of mechanical art and the essential factor lies in the usefulness of the appliance.

There are certain lines in the ideal or normal arrangement of the teeth that

Fig. 20.

Fig. 21.

Fig. 22.

Fig. 23.

must be observed in their temperamental modifications. These ideal lines are the arc of a circle described by the six anterior teeth, the straight diverging line of the buccal surface of the bicuspids and molars, the compensating curve of

the occlusal surface of the bicuspids and molars, and the lateral inclination of the teeth.

This slide (Fig. 5) is a photograph of a mandible exhibited in the Wister Institute of Anatomy, Philadelphia. It is copied from page 263 of Turner's "American Text-book of Prosthetic Dentistry." This slide beautifully exhibits the lateral inclination of the teeth, it also shows the marked concave plane described by the lateral movements of the teeth. This lateral inclination must be in harmony with the inclination of the condyle path. If the condyle path be horizontal, the lateral occlusal plane must be horizontal, otherwise normal occlusion cannot exist. In setting up artificial dentures it is imperative that the lateral inclination and compensating curve shall be reproduced.

This slide (Fig. 6) shows the diagrammatic sketch of Dr. Bonwill's as taken from Litch's "American System of Dentistry," vol. ii, page 488. It illustrates Bonwill's conception of the increasing length of the cusps and overlap, a condition that could only exist in a horizontal condyle path. In nature, however, this does not occur, for a horizontal path is accompanied with a flat horizontal plane, with flat cusps and no overbite; otherwise the ideal three-point contact could not exist. Fig. 7 is a diagrammatic drawing of Professor Christensen's (Turner's "Prosthetic Text-book," page 414), illustrating his confirmation of Dr. Walker's mandibulo-glenoid discoveries. This demonstrates why with long bicuspid cusps and nearly perpendicular eminentia articularis, the incisive overlap must be short, and the elevation of the second molars must be pronounced, else the three-point contact cannot be produced. This diagram demonstrates also why prosthetists have found that cases beautifully constructed by Dr. Bonwill's method rarely work with the same perfection in the mouth, which is one reason why this method has not been adopted by the profession. Another reason why the profession has not adopted this method is the long time re-

Fig. 24.

quired to accomplish the work, and the uncertain results withal.

Fig. 25.

Fig. 26.

Fig. 27.

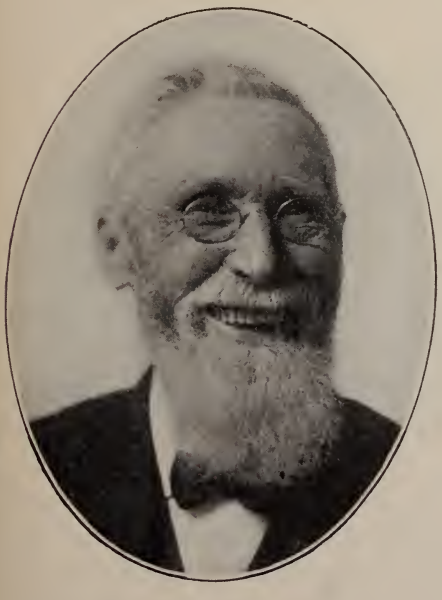
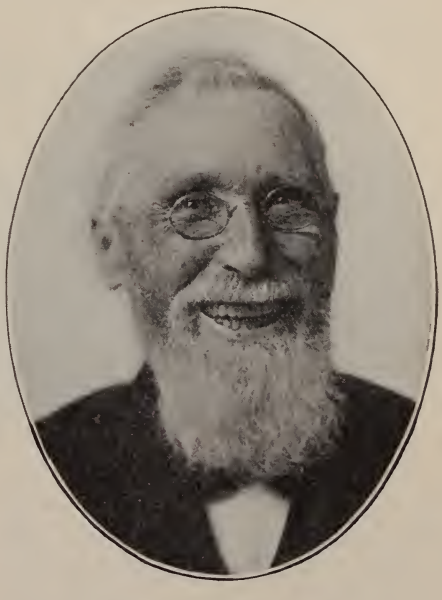


Fig. 28.



These remarks are not intended to in any way cast reflections upon the work of Dr. Bonwill, because we recognize that he was one of the greatest scientists and prosthetists our profession has produced. We recognize that he discovered

a fundamental truth. We also know that it is rarely given to any man to discover a great truth and to develop it to its fullest possibilities. It required the earnest labors of Dr. Walker, Dr. Christensen, and Dr. Snow to bring that truth to its present state of development.

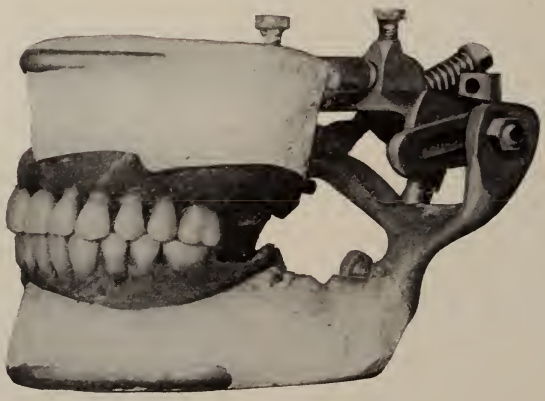
On page 494 of Dr. Bonwill's article previously referred to, he says, "—and how much arched upward at the ramus from the *second bicuspid* backward and upward." In other words, that the second bicuspid marks the lowest point and that all of the molars are progressively elevated.

This slide (Fig. 8) is made from a photograph of a skull in the possession of Dr. F. A. Peeso. It is copied from page 254 of Turner's "American Text-book." This shows that, in beautifully antagonized dentures, the distal cusp of the first molar is in the most depressed position and that the second and third molars are the only ones elevated. As the third molars are rarely replaced in artificial dentures, it implies that if we were to reproduce this set of teeth with artificial substitutes, the compensating curve would be produced by the proper setting of the second lower molars upon

Fig. 29.

Fig. 30.

Fig. 31.



each side, as the twelve anterior teeth are seen to be in a straight line.

We believe that this skull is no exception, because, so far as we have observed in a small number of perfect specimens of antagonization, we have found this to be the rule. Therefore we believe it to be a law of nature, that—*The twelve anterior teeth are arranged in a straight line and that the compensating curve is formed by the elevation of the teeth distal to the first molar.* We know that a system developed upon this rule very much simplifies the operation of producing anatomical antagonism, and that the average operator should not be content with his proficiency until he is able within two hours' time to grind, set up and wax ready for trial in the mouth a complete upper and lower denture. This does not include the twenty or thirty minutes that may later be required for reproducing the sulci and the developmental grooves. Dr. Bonwill was a remarkably expert and rapid operator, and so, if we remember that he used to say that it often took him all day to grind up a complete denture, we can appreciate the saving of time which this simplified system affords.

Before explaining the technique of the simplified system, its application will be

Fig. 32.

Fig. 33.

shown upon the screen by the aid of various views of two practical cases.

Fig. 34.

FIRST CASE.

Fig. 9. The patient is about sixty years of age, of a sanguine modified by a nervous temperament. The teeth selected for this case were S. S. White "natural forms," mold No. 227, shade No. 40. It will be observed that the teeth are of sufficient length to nearly fill the space between the high and low lip lines, so that when the lips are raised to the highest elevation only a slight trace of gum restoration is observable—so slight, indeed, that the material is not noticed. The overlap, lateral inclination, compensating curve, diverging buccal straight line, and esthetic features may all be observed. Vulcanite base-plates were used. The teeth were ground, set up and waxed ready for trial in the mouth in one hour and twenty-five minutes.

The next slide (Fig. 10) is the same case with the dentures slightly apart, thus better showing the lateral inclination and compensating curve.

Fig. 35.

Fig. 36.

In Fig. 11 the teeth are in right lateral occlusion—that is, the mandible is carried to the right side of the mouth, showing that the cusps on the right side and

the incisors are in contact; also, upon the left side, the lower second molar is in contact with the upper first molar only. Thus we have one position of the so-called three-point contact.

This slide (Fig. 12) shows the reverse of the preceding—that is, the left lateral occlusion. On the right side the lower second molar and the upper first molar only are in contact, but through the three-point contact the dentures are evenly supported and their retention is not disturbed.

This slide (Fig. 13) presents the completed dentures. The entire actual time of work spent in constructing these dentures was eight hours and forty-six minutes.

This slide (Fig. 14) is a view of the lingual surfaces.

The next slide (Fig. 15) shows the maxillary and mandibular surfaces.

Fig. 38.

This slide (Figs. 16 and 17) shows the edentulous patient for whom the artificial dentures have been constructed.

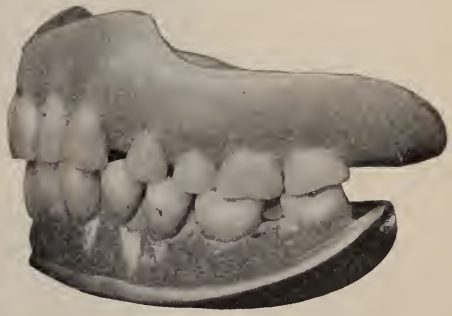
In the next slide (Figs. 18 and 19) the left picture shows the patient with her old artificial teeth; the right one shows the change made by the new teeth.

This slide (Figs. 20 and 21) shows the patient's profile view with the old teeth from the left side, and with the new teeth from the right side.

These pictures (Figs. 22 and 23) show the patient laughing. It is no easy thing for a patient to assume an easy, graceful expression when laughing at a camera for the express purpose of showing the teeth. A laugh cannot be photographed by an ordinary camera, since it consists of a number of facial changes, of which the photograph can show but one. These pictures show, however, as was intended, that in the left photograph the lower teeth are entirely out of sight and the upper teeth have a sunken or retruded appearance, while in the photograph upon the right the lower teeth do show slightly, and the upper teeth have the contour indicative of the sanguine temperament, without showing the artificial gum. If this expression of laughter is not pleas-

Fig. 37.

Fig. 39.



ing it is no fault of the mechanic's, but it is to be blamed on the esthetist.

Fig. 40.

Fig. 41.

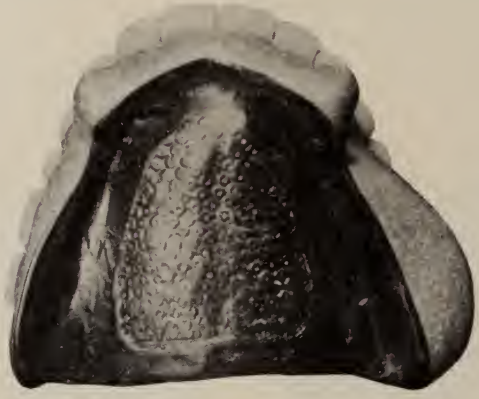


Fig. 42.

SECOND CASE.

While doing the work just presented, a gentleman called to consult me regarding new dentures. He was wearing dentures constructed by my father and myself in 1876. After the new dentures were completed, I requested the privilege of having some photographs taken that we might use them for illustrating pur-

poses. He kindly consented, and we have the pleasure of showing three slides of his case.

The patient was eighty years of age, and of a strongly sanguine temperament. The teeth selected were S. S. W. mold No. 33, shade No. 48.

for whom the prosthetist has to make restorations, especially if he be limited to vulcanite. Because of this condition, gum section teeth were used when the patient was supplied with artificial dentures thirty-two years ago. The result is shown in his picture (p. 69). Contrary

Fig. 43.

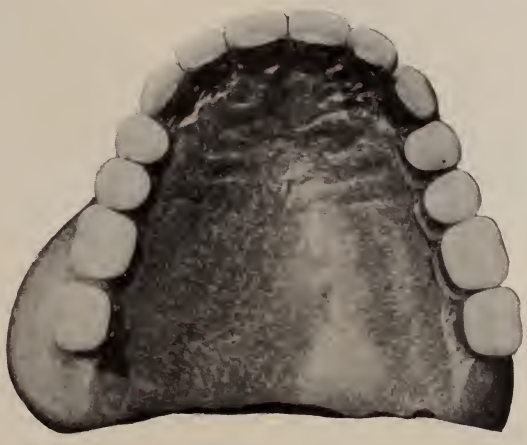


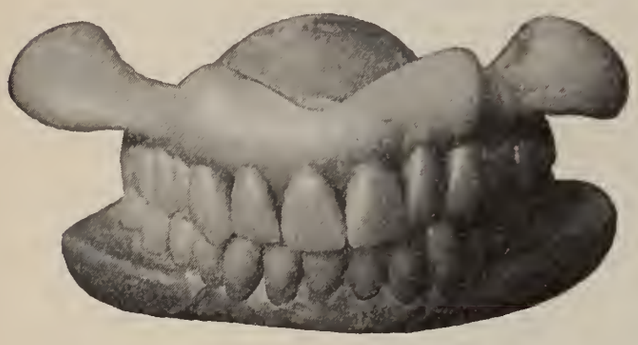
Fig. 44.

One of the patient's sisters, having most of her natural teeth preserved at the age of seventy-three, and his daughter, both being of the same physiognomical type as the gentleman, show at least one-fourth inch of gum above the gingivæ when they laugh; thus our patient represented the difficult class of cases

to the former accepted ideas, plain teeth are usually better adapted to this class of cases than gum sections, for by the use of the former the protrusion of the upper alveolus can at least be modified. The upper teeth are set quite close to the process, with but a single thickness of base-plate wax over the gum at the loca-

tion of the incisors, while the canine eminences are at least twice as thick. All of the teeth are ground upon their morsal edges and surfaces to simulate age. The result is that in extreme elevation

Fig. 45.



of the upper lip only a suspicion of gum appears. In order to open the mouth to the proper distance the lower teeth should be raised in a patient of this age, so that they are in evidence when the wearer is speaking or laughing. In the old dentures they are not raised.

Fig. 46.

This slide (Fig. 24) shows the dentures in normal occlusion.

The next slide (Figs. 25 and 26) is the profile view. The picture on the left shows the patient with the old teeth in his mouth, while the next picture shows the new ones. A patient with a beard is poorly suited for demonstrating facial contours, but by comparing the relative position of the mustache and the tip of the nose it is observable that the upper lip is more protruding in the picture upon the left, due to the gum-section teeth. It may be observed that in relation to the upper lip the lower lip is retruded.

This slide (Figs. 27 and 28) shows that while in the new dentures the teeth are larger and more in harmony with the physique than in the old, they are not so conspicuous. In the old dentures the lower teeth are entirely out of sight, while with the new ones they can be seen.

TECHNIQUE OF GRINDING AND ARRANGING THE TEETH FOR A COMPLETE ARTIFICIAL DENTURE.

Attention has been called to the necessity of having perfect occluding and contouring wax models, and that they must be properly mounted upon the

Fig. 47.

anatomical articulator by the aid of the face bow and bite guides. The portion of wax representing the upper teeth upon either side of the mouth should be removed bodily—that is, the segment of wax bounded by the median and the high lip lines upon either the left or the right side of the upper wax model. This leaves

the wax contour of the gum portion intact. The six teeth, having been properly ground, are set in place to restore the contour of the removed wax. The incisors and canine should be given such variation from the normal outline as the judgment of the esthetist dictates; this arrangement, however, will be subject to change when the dentures are tried in the mouth. The bicuspids and first molar are given the lateral inclination indicated by the pitch of the condyle path; and the morsal edges and surfaces are arranged on a straight occlusal plane. These six teeth are secured with wax. This same procedure is applied to the opposite side. The twelve upper teeth are now mounted to a straight occlusal plane as was seen in Fig. 8.

The lower wax rim, one side at a time, is cut away and the teeth are arranged in their relation to the upper ones. The bicuspids and molar must perfectly interdigitate, while the incisors and canine should be just free and but slightly underlap the upper ones. The teeth should now be placed in lateral occlusion, and such corrections should be made as may be necessary. The six teeth on the opposite side are treated in the same manner. Twenty-four teeth have now been arranged in sections of six, and all are mounted to a straight occlusal plane. The wax securing these teeth to the base-plate should be thoroughly cooled. The lower second molar upon either side is to be placed next. The placing of this one tooth forms the compensating curve. This tooth is easily located by cutting away the hardened wax in the location of the second molar and by supplying well-softened wax. The tooth should be placed at an angle parallel with the condyle path and in a little more elevated position than will be required when adjusted. The condyle path upon the side of the articulator on which the molar is being adjusted is grasped with the thumb and forefinger, and both arms of the articulator are firmly held in the palm of the other hand. By repeatedly placing the teeth in the lateral and incisal occlu-

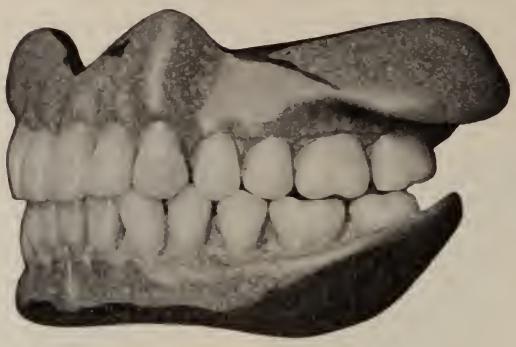
FIG. 48.

FIG. 49.

FIG. 50.

sal positions the second molar will be properly located in the softened wax. It may be necessary with the thumb and finger to aid the direction of the tooth.

Fig. 51.



As the upper second molar can occupy but one position, all that remains upon the opposite side is mounted in like manner.

Fig. 52.

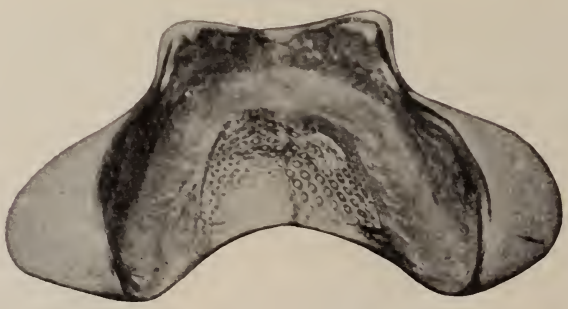


Fig. 53.

It is apparent that the wax supporting the twenty-four teeth must be cold and hard while adjusting the second molar in the soft wax. The second lower molar to be done is to cut away sufficient wax to permit the tooth to drop into occlusion, and to make it fast with melted wax.

Is it not evident that in constructing a full upper and lower set of teeth, the only triangle that is necessarily given practical consideration is the small triangle formed by the upper first molar and the lower first and second molars? occlusal plane, and if one end be raised, there can be no contact except at the other end. If there is, however, much length to the cusps of the bicuspids, the upper canine may occlude with the lower first bicuspid when placed in incisal

FIG. 54.

FIG. 55.

The key to the correct anatomical antagonizing of complete dentures is represented by these three molars. If this conclusion be correct, then it follows that when the teeth are placed in incisal occlusion there can be no cusp contact except between the anterior teeth and the upper first molar and the lower second molar; because, if the twelve teeth in each dental curve or arch have a straight occlusion. This is certainly no disadvantage, for as long as there are three points, properly placed and in contact, there can be no tilting. As the teeth are coming in crushing contact progressively, far less power will be required than if all the teeth occlude at the same time. As only about one-fourth of the crushing force can be used with artificial dentures that may be used with the natural organs,

any arrangement that economizes force is a blessing.

set in place to restore," etc. Now attention is drawn to the grinding of the

Fig. 56.

Fig. 57.

GRINDING THE TEETH.

Instruction has been given, "The six teeth having been properly ground are

teeth. There are two stages and two objects in grinding. The first stage and primary object is to grind them so that

there will be perfect interdigitation and the largest surface contact; this preliminary grinding is done in sections of six, at the time when the teeth are mounted in the wax. It is the opinion of the essayist that *the teeth should be received from the manufacturer in this form.* The second stage and secondary object of grinding comes up after the teeth are permanently attached to the base-plate; this is also a part of the finishing process. It consists of forming the sulci and the developmental grooves; also of relieving any points that may interfere with the various movements of antagonism.

The incisors are squared upon their incisal edges, the upper ones lingually and the lower ones labially. The morsal edges of the canines will be flattened to represent wear. It will be necessary to lengthen the mesial morsal edge of the upper canine and the distal morsal edge of the lower canine.

The bicuspids have a mesial and distal morsal surface, while each molar has but one morsal surface. As the molars are larger and simpler in form, we will first describe the process of grinding them. They are each ground to form three plane surfaces. This is done by placing the morsal surface upon the edge corner of a large sized half-inch-thick wheel and grinding a groove mesio-distally with the pit of the groove between the sulcus and the buccal cusp in the upper molars, and between the sulcus and lingual cusps in the lower molars. Thus two inclined plane surfaces are formed, the bucco-sulcus and the linguo-sulcus. An inclined plane surface is ground upon the lingual surface of the upper molars, known as the lingual plane. A buccal plane is ground upon the lower molars.

The same three-plane surface will be formed upon both the mesial and distal morsal surfaces of the bicuspids, except

Fig. 58.

on the lower first bicuspids, which should have the lingual cusps nearly ground away.

In the final grinding, the mesial and distal fossæ may be produced by the use of the engine carborundum points; and the grooves and sulci may be produced with engine knife-edge stones. The extent to which the fossæ, sulci, and grooves are reproduced is only limited by the skill and time devoted to the work by the operator. The object of this grinding is more than beautifying, as it produces edges to catch and cut the food in the process of mastication. For practical purposes the finely carved surface will not be so effectual as the one having sharp-edged pits.

A word of caution is necessary. The buccal groove of the lower second molars should never be extended into the bucco-sulcus plane, since the distal margin of the linguo-sulcus plane of the upper first molar, when assuming the position of lateral occlusion, will drop into such a groove, and momentarily destroy a point of contact.

Fig. 29: Section of wax removed.

Fig. 30: Six teeth in place.

Fig. 31: Twenty-four teeth in place.

Fig. 32: Adjusting the lower second molar.

Fig. 33: Plaster casts showing the end view of teeth in the first stage of grinding.

Fig. 34: Showing the relative position of the surfaces to each other.

Fig. 35: Teeth mounted in wax showing first stage of grinding.

Fig. 36: The finished dentures.

Prosthesis practiced as a mechanical art can be reduced to a system of a few rules—these covering all cases. The esthetist knows but one rule, and that is the rule of harmony: *Each case must harmonize with its environment.* We shall close by showing views of a few practical cases illustrating this rule of harmony.

Fig. 37: A receding chin and prominent upper central incisors.

Fig. 38: The gum restoration was quite thin and evenly placed. This apparently one-sided denture had a symmetrical effect on the face.

Fig. 39: A profile view of the same case, showing the effect of spacing, especially effective with continuous gum work.

Fig. 40: A unilateral restoration to straighten a crescent-shaped face.

Figs. 41 and 42: Another view of the same case.

Figs. 43 and 44: Lingual view of the same case.

Fig. 45: This and the next three photographs show different views of heavy restorations in continuous gum upper, and cast metal and vulcanite faced lower. These dentures have been worn for years and were kindly loaned by the patient.

Figs. 46 and 47: The lingual surfaces.

Figs. 48 and 49: Another view.

Fig. 50: Unfortunately in arranging this view for sharp profile the interdigitation was lost, so that the retruding mandible is more marked than it should be.

Fig. 51: This and the remaining four photographs show extensive restoration in vulcanite.

Figs. 52 and 53: The maxillary and mandibular surfaces.

Figs. 54 and 55: The lingual surfaces.

Figs. 56 and 57: Pictures of the edentulous patient (Fig. 56) and the restoration (Fig. 57).

Fig. 58: Another view of the same patient after restoration.

Discussion.

Dr. B. J. Cigrand, Chicago, Ill. To be invited to open the discussion of Dr. Wilson's scientific paper is indeed a compliment. Its careful study has led me to the opinion that he has brought to our attention many important deductions which as time goes on will absorb more of the consideration of all prosthetists who are anxious to reproduce nature in accord with her well-defined and systematic underlying principles. The essayist shows an earnest and thoughtful investigation of the physiology of the masticatory apparatus of man, and his research into the literature of the subject, with his liberal recognition of the quotation marks, indicates his well-disposed mind toward the men who have blazed the way before him in this difficult and intricate mechanism of morsitation. Fundamentally, he hopes to correct by his paper many wrong impressions both as to the terminology and the principles of prosthetic procedure; in this he is frank, and is certainly pursuing the right course. If anything furthers the progress of a profession, it is clearly defined and well-understood terms, which are of considerable moment to our profession, since we are so reluctant regarding the acceptance of definitions on even some of the simplest problems. When we shall have arrived at the point where our terms, whether used orally or in print, shall be thoroughly understood, then only shall we have reached the high road which will lead us speedily to the eminence of scientific practitioners. We must arrange to perfect our prosthetic nomenclature, thereby creating a means of clearly conveying our thoughts.

The term *articulator* as applied to an apparatus upon which we arrange the dental substitutes to conform with the natural dental organs is not a term which is in accord with the origin of that word. The word articulate, if used to indicate the coming together of the jaws, is not in conformity with its original meaning. The teeth in the maxilla articulate with their several adjoining neighbors at what we call the contact point. In other words, here they come into direct relation, they form a joint, and articulator in Latin means a joint. A joint such as the knee, elbow, fingers, toes, shoulder and hip impresses us with a clear idea. Where is the joint in the coming together of the teeth? If that joint be anywhere, I would look for it in the glenoid fossa, where the condyle of the mandible moves in its prescribed socket. The term should not be articulation if we mean antagonism, which latter word means a rivalry, an opposition, a duel, a combat or contest; such indeed is the relation existing between the two jaws. Their function of opposition and constant battle is too well understood to need further description, and hence the live, active, and energizing word antagonism will better express the mandibular condition involved in the maxillary antagonism. The old term, occlusion, is only of value if we mean to tightly shut the jaw, to firmly lock or definitely intercusp the teeth. If you mean to eliminate action and wish to express the inactive, the closed and welded relation of the jaws, we should use the word occlusion. If this latter word be used in connection with the various surfaces of the many teeth, it again falls short of its original meaning. If we arbitrarily attribute a meaning to a word, then there is no limit to what we may call

an action, a relation, or a condition; then "A rose would smell as sweet by any other name." The lingual surfaces of the upper anterior teeth being ridden by the lower incisal ones, occlusal has no definite meaning, since according to the now prevailing idea of the word, both must be designated by the same term. The word which has impressed me as having a better or more definite meaning is the term *basal* surface. The teeth have apices, and logically must have bases, and the original meanings of the words base and apex are exact, and we all comprehend what they indicate. Dr. Wilson employs the word "morsal" instead, and his suggestion shows that he also disliked the term occlusal in this connection.

There are so many points to settle, if we wish to have the terms agree with the basic ideas of the words, that possibly the only manner in which we can expeditiously arrive at the right words and proper definitions is to make a list of those terms which we fail to agree upon and submit them to linguists, whose life-work fits them for such an analytical judgment. We are certainly not sufficiently versed to establish our terminology in strict keeping with linguistic evolution, since only men who have given their lives to that task are able to bring order into this subject. The average university graduate is quite capable of judging about simple and ordinary terminology, but when it comes to delving into the remote past, into the formation of language and the evolution of literature, we shall profit by consulting able linguists, who can readily assist us in our attempt to unify our comprehension of terms. The other learned professions have done likewise, and none of them have thus far complained of having lost professional dignity by consulting those most likely to know.

It afforded me pleasure to find that the essayist emphatically denounced the use of the old-time plain-line antagonizing frame; the hinge-like or ginglymoid frame is of little service to the truly qualified prosthetist. Its simple opening and shutting motion does not do justice to the varied action of the jaw; hence an apparatus based upon its action is always insufficient when placed in the mouth, which is the real and only test of any reproducing appliance. While the several antagonizing frames which he mentions are all very likely to bring about splendid results, yet let me suggest that he who depends too much and too earnestly upon producing finished and faultless dental substitutes on these frames will certainly fall below the level of his calling, since we who practice the art and science of dentistry can never hope to follow definite rigid rules and laws, for our vocation ever induces us to observe the "lack of rule" in nearly all that pertains to the reproduction of dental organs, and to the prosthetic ideals as related to the unequalized details of the two sides of the face. The mouths of the same family are different, the shapes of the teeth are not alike even in the same oral cavity. The arches or curves of the mouth being without symmetry in the same person, with all the other innumerable diversities involved by extractions at different periods of the individual's life, dispel the idea that such machine-made products can ever be arranged according to a definite rule so that they will stand vigorous examination as to their correct reproducing qualities, if we take into consideration

the contour of the face, the outlines of the jaws, and the quartet of temperaments.

While speaking of temperaments, let me add that this subject at present is entirely too little considered in the meetings of bodies of students and researchers such as compose the national dental organization, and I congratulate Dr. Wilson upon his efforts in this direction. It has been my pleasure to discuss his many and splendid papers on the subject of temperaments, and he deserves commendation for his steadfastness in his study of this subject. Here, again, it would be better for us to take into our confidence people who have made a life-study of this matter and have burned the midnight oil in the study of the specialty of physiognomy; they could certainly lead us to observe many now obscure phases of this fascinating subject. The scientists who have devoted their time to the analysis of the face as complemented by both body and mind, have named these four temperaments by terms which are different from those used by the dental profession; possibly we know best, probably they are misinformed, though I am of the personal belief that they, and not we, are in harmony with the facts. The temperaments as they indicate them are motive, mental, sanguine, and lymphatic. We substitute the word "bilious" for the term "motive," and this has induced a recent writer to say that the condition of biliousness may be found in any of the temperaments, and is not particular to any one, being an ailment and not a predominant physical characteristic.

Dr. Wilson uses the term interdigital in referring to the locking together of the teeth. While this may be the best term, it does not originally apply to anything other than the fingers, and so its use here would seem strained.

The word *contrate,* meaning the fitting together of teeth, like the cogs of wheels, or the intercusping, might be more in line with its original definition, for the etymology of a word must always be the foundation for our terminology if we ever hope to stand upon common ground.

His clear distinction between "normal occlusion" and "natural occlusion" was most happily expressed.

For his technique in arranging the teeth and for the numerous stereopticon slides employed to demonstrate his ideals, only the highest possible praise can be offered. His ambition to bring the profession to a better realization of the art and science of dentistry must appeal to all who know him personally, since his candor and zeal in this direction are an eminent factor in his professional career. My inability to refer to the slides prevents my dwelling upon any one point particularly. In the belief that his paper will be carefully read and studied, and that the dental profession will be liberally benefited by his tireless energy, I yield the floor to others eager to further testify on his behalf.

Dr. G. B. Snow, Buffalo, N. Y. This matter of articulation has been to the dental profession something like religion—it can be preached better than practiced; practice, however, brings us nearer to perfection. Dr. Wilson has given us an excellent exposition of what can be done with the anatomical articulator, and he certainly is a master in its use. The work is simple enough when the bite is correctly taken and the models are placed in the right positions in the articulator. It is essentially a mechanical question that is solved by imitating

the peculiarities of the patient. The temporo-mandibular articulation must be taken into consideration, and the movements of the mandible must be imitated, or else the teeth cannot be correctly used for chewing. The main problem in articulating the teeth is to get the three-point contact which will enable the teeth while biting on one side during mastication to have contact on the other side, thus preventing the tipping of plates.

The problem of articulation is not new. It has been under consideration since 1840, when Dr. Evans patented an anatomical articulator. He had the idea that it was necessary to imitate the movements of the mandible, and he gave us something that approached them; but like many other inventions his was not a success, and I do not know what has become of it. Then Dr. Bonwill took up this work, and after him many others, especially Dr. Christensen, have done good work of this kind.

I rejoice to see that this work is so nearly approaching the point of perfection, and that we are now able to guarantee our patients much better results than ever before.

Dr. C. H. Land, Detroit, Mich. I have been very much interested in this paper because of its esthetic phase alone. We hear people express their opinion on the difference between what they call soldier teeth and artistic teeth, and we should take that into consideration. There is no doubt that a great deal can be achieved in cases where entire sets of teeth are demanded, but instead of blaming the manufacturers for not producing more perfect teeth, we had better look to ourselves. I know that they do produce natural teeth, and if we have the necessary artistic ability we can in our laboratories obtain with these teeth any result we wish.

Notwithstanding the elaborateness of the question of articulation and the benefit that it affords the patient, it is very simple, and not as important as the proper adaptation of the dentures to the alveolar ridges. The essayist seems to have left that feature out of his paper. A set of teeth is of little value if the ridges are not properly considered. If we are to have practical results, it is certainly far more valuable to have the plate well adapted and have it stay where we put it. Although the essayist has dwelt on the artistic question, one of the greatest troubles lies in the difficulty of the adaptation of the denture to the ridges. We have seen people getting along with a full plate of three teeth, and this reduced merely to the incisors, while the rest had been broken off; how about the antagonism there? In such a case the plate is held in proper place simply by the adaptation to the alveolar ridge. Some day I hope to show you some of the points with regard to the balanced contact to the various angles of the alveolar ridge. The adaptation of the plate is much more difficult and important than the articulation. There are some mouths in which no plate will fit, no matter how the teeth are articulated. There are some mouths in which we are utterly unable to make the denture fit well. There are others in which any dentist can make a denture fit without any particular amount of skill. Again I claim that as soon as we develop the proper artistic sense we can produce any desired result with the teeth furnished to us by the manufacturers, but we must not forget that we must make them stay where we put them.

There are many people who believe that atmospheric pressure keeps plates in the mouth. It does nothing of the kind. If we were using atmospheric pressure to retain dentures, then it would be necessary to exhaust the air from a given space, and that space might be a half-inch or an inch and a half. If we were using atmospheric pressure, one and one-half inches would hold the plate tighter than one-half inch. But in order to utilize atmospheric pressure we have to create a vacuum, and there is nothing more ridiculous in dentistry than that. Supposing we exhaust the air from one of the cavities, how long do we have pressure? We cannot have practical results unless we use a valve and suck the air out, and the power of the tongue to suck the air out is never more than one and one-half pounds to the square inch. But supposing we do obtain this vacuum, the saliva tissue comes between the plate and the hard palate, and we are again where we started from. Where you have horizontal surfaces, the minimum amount of saliva between the plate and the palate will give you the maximum amount of adhesion, and that is never more than one and one-half pounds of adhesion to the square inch, and never a vacuum.

I wish to call your attention to the fact that while this has been a very elaborate paper and one that I admire, because it certainly shows some very good points, there are other valuable features that the essayist seems to have overlooked entirely.

Dr. WILSON (closing the discussion). I will not take up much time in closing. I am very glad that Dr. Williams has sent the communication that is about to be read to us, because we all know that he is thoroughly interested in the subject. Dr. Land has introduced a phase of the subject other than what I designed to cover in this paper. The subject of the construction of artificial dentures is a very broad one, and I only wished to stress the importance of antagonizing the teeth properly, and at the same time not leave the impression that it is all a question of mechanics. There is the esthetic side, which we must recognize. This feature, in connection with antagonization, is all that I desired to bring forward at this time. The paper was certainly long enough.

In connection with this subject Dr. E. S. Gaylord, New Haven, Conn., asked and was granted the privilege of presenting a communication from Dr. J. LEON WILLIAMS, London, England, entitled "A Plea for More Scientific and Esthetic Forms of Artificial Teeth."

The communication here follows:

A Plea for More Scientific and Esthetic Forms of Artificial Teeth.

By J. LEON WILLIAMS.

Gentlemen of the National Dental Association,—You are all doubtless aware of the efforts which I have been making during the past year to secure more scientific and artistic forms of artificial teeth. You have read the published letters of many who have given special attention to this subject, and you have seen

that there has not been a single dissentient voice in these utterances. All who have spoken have expressed themselves heartily in favor of what I am asking for.

You have also seen that several important societies, including the Odontological Society of France and the St. Louis Dental Society, have passed resolutions indorsing this movement. But the manufacturers still seem to think that there is not sufficient evidence that the profession as a whole demands these improvements for which we are asking, to warrant the necessary outlay.

I am therefore making this appeal to you to take the last step necessary to bring about what we wish. It had for some time been my intention to be present at this meeting and make my appeal in person. Fate has decreed otherwise, but I hope that the eloquence and earnestness of those who are most interested in this proposed reform will be more effective than my voice would have been.

You have heard Dr. Wilson's interesting contribution to one phase of this subject, and I may say at the outset that I indorse nearly every point he has made. Near the opening of his paper he has said, "Orthodontists consider occlusion to be of fundamental importance in their art. Prosthetists should give consideration to this function, but far more attention to that associated function (call it what you may) denoting action." He further says, "If the skilled artizan to his proficiency adds esthetics he becomes an artist and is entitled to be ranked as a professional man and to receive the emoluments of his profession." Improvements in artificial teeth constitute the first step toward the realization of these ideals. Dr. Wilson rightly places use before esthetics, but, as Ruskin so often showed, the two principles, at the highest, are always united. We are therefore asking the manufacturer to give us artificial teeth with which a more perfect occlusion may be obtained with less labor than is now necessary, and which in other respects are more closely modeled after the natural teeth, and therefore would be more beautiful, more in harmony, when properly selected, with the other features.

Right here I wish to emphasize what I believe to be an important fact, namely, that there is not a manufacturer who would not be glad to go to the expense of producing a new system of molds if he felt certain that the profession wanted this work done. One of the largest makers of American artificial teeth is at the present moment in London. He has called on me and expressed himself emphatically in accordance with the above statement.

You see, therefore, that the matter rests entirely with you. If the National Dental Association at this meeting passes a resolution indorsing this movement, and asking that these suggested improvements be carried out, I am confident that results of great value will follow before the next annual meeting.

What is it then, specifically, that we want? In answering this question I will place our demands in what I regard as the order of their importance:

First: Molars and bicuspids which are carefully modeled after the shapes of natural teeth, especially in regard to the occluding surfaces. These occluding surfaces would not be modeled on the teeth of youth, but on the somewhat worn surfaces of middle life.

Second: Incisors carefully modeled after the natural teeth, beginning with the four basal temperamental types and

introducing the more characteristic so-called "accidents of nature" as to contour and surface texture and markings.

Third: Better gradation and delicacy of coloring of the teeth.

Fourth: The arrangement of all artificial teeth into a system whereby the difficulties of making the proper selection would be greatly reduced.

Let me elaborate somewhat these four demands, commenting on various points as I proceed. So much has already been written in the way of criticism of the occluding surfaces of bicuspids and molars as at present made that it would hardly seem necessary to further emphasize this point. I have never seen any attempt to defend these faults of artificial teeth as now made. Why, then, are they continued? Because the profession has never, in its corporate capacity, demanded a reform. Nothing is really easier than to bring this about, and nothing but the most pronounced indifference will prevent its being brought about. Can any intelligent, progressive dentist be found who will take up the position that artificial bicuspids and molars should not be of the same size and shape as the corresponding natural teeth? Nothing of the sort is in existence, and I believe that no manufacturer has any plan or method of working whereby a full set of teeth can be produced so that the upper teeth shall be in proper relationship to the lower. The convex tubercles to be found on the occluding surfaces of all artificial teeth as now made do not correspond to anything in nature. They are largely removed by every skilful dentist in mounting, and this necessitates much labor, which should be made unnecessary.

To illustrate how imperfect incisor teeth as they are now made are, I will relate an experience I have just had. I extracted two loose central incisors, the only teeth remaining in the jaw, and sent them to be matched in artificial teeth. The natural teeth are very beautiful in shape, texture, and color. The falseness of appearance in the best match that could be found in artificial teeth was very striking, and when one came to closely study the natural and artificial tooth side by side, it was easy enough to see and point out the faults in the artificial tooth. All angles and corners in the artificial tooth were rounded off, the effect being mere prettiness, with the loss of the finer beauty of character. The contrast in color between the tip of the tooth and the neck was much more marked in the artificial tooth. All with whom I have talked or corresponded are agreed that there has been a marked degeneration in the last twenty years in the coloring of teeth. In the artificial tooth to which I have just referred there was a total absence of those delicate surface markings which add so much to naturalness of appearance. I have long noticed that when the manufacturer attempts to imitate any peculiar marking of the natural teeth he grossly exaggerates these markings, and makes them with a mechanical regularity that completely converts the effect into caricature. So far as one can see, no manufacturer has yet employed model-makers with exact knowledge and fine artistic taste. It is folly to pretend otherwise, because the results are before us, and I am inclined to think that the majority of dentists do not realize the great possibilities for improvement in this direction. That appears to me to be the real explanation of the seeming indifference. If this work of reform is once started, I think all will

be astonished that it should have been delayed so long.

I believe there is also a consensus of opinion that artificial teeth are not as strong now as those were which were made twenty or thirty years ago. There seems to have been a general, all-round degeneration in the work, and several manufacturers frankly admit this. No doubt one reason for this has been the concentration of the profession on so-called operative dentistry, to the great neglect of the prosthetic branch. Is it not true that the prevailing sentiment among the undergraduates in our dental colleges runs in the direction of doing as little prosthetic work as possible? Not long ago I attempted to make use of the services of a young man who has a double qualification from two of the best American and European schools. He was asked to make an upper and lower partial plate for a mouth presenting no unusual difficulties. After spending a week over the case, it ended in a complete failure and had to be entirely reconstructed. I do not think this instance an exceptional one, and I am convinced that this work of reform in artificial teeth must be educative among dentists as well as with the manufacturers.

I now come to my fourth demand, which is for the arrangement of artificial teeth into a system. I have mentioned this matter several times in recent communications to *Items of Interest,* and it seems hardly necessary to go over the ground completely at this time. Briefly, my claim is that from fifty to seventy-five molds or models of carefully selected temperamental and racial forms of teeth, of the necessary sizes, arranged in a scientific system, would give us far better resources than all the molds at present in existence. It should be possible for any intelligent dentist to select the teeth for any given case from shade and model guides in five minutes, and order his teeth with a certainty of getting the best possible effect and result for that particular patient. Furthermore, if my suggestion is carried out, hundreds of dentists would find it possible to carry a sufficient stock of teeth for general purposes who now find it useless to attempt such a thing, and thus the manufacturer would get an immediate return for his outlay.

I have challenged any manufacturer, or anyone else, to produce a set of artificial teeth which cannot be placed in one of eight or ten groups and show any important differences. If my position is correct, what possible excuse can there be for the present lack of system and for the confusion caused by the great number of molds which more or less overlap each other. Fewer molds and better forms is our demand, briefly put.

My suggestion to the present meeting of the National Association is that a resolution be passed asking the manufacturers to give this matter their immediate and serious attention, and that a committee be appointed to go into the entire subject to correspond and confer with those who are able and willing to assist in bringing about the suggested improvements, and also to confer with the manufacturers to this end.

Fraternally yours,

J. Leon Williams.

The next order of business was the reading of a paper by Dr. H. A. Pullen, Buffalo, N. Y., entitled "The Import of Certain Etiological Factors in Treatment in Orthodontia," as follows:

The Import of Certain Etiological Factors in Treatment in Orthodontia.

By HERBERT A. PULLEN.

The relation of the etiology to the treatment of disease or deformity is so important that a consideration of such treatment would be unscientific, and many times unproductive of results, unless the causative factors of the disease or deformity to be treated are taken into account.

In all treatises on therapeutics the logical order of consideration is, first, etiology; secondly, diagnosis; and lastly, treatment. The primary study of the etiology leads up to the symptomatic phases of a disease with which the diagnosis has to deal, and the rational treatment is such as has been discovered through investigation of the etiological factors.

If in the treatment of diphtheria we use an antitoxin, we are referring directly to the etiologic factor, viz, the bacteria from which the antitoxin is produced.

In our own special field of orthodontia we are always looking for the causes of malocclusion and of the abnormal conditions of maxillæ or mandible accompanying it; and while the etiological factors are many times obscure, the progress in treatment shows that a more definite knowledge of their interrelationship has been gained.

The inauguration of diagnostic interpretations on the basis of occlusion has called forth an earnest study of the early symptoms of developing malocclusions, a very large percentage of which exhibit such peculiarities of maldevelopment of the dental and maxillary arches* as to claim a most serious consideration of the possible etiological factors, and their probable bearing upon operative treatment of such abnormal conditions.

The proportions and contour of the external face are likewise somewhat of a guide or index to the physiological or pathological conditions of underlying anatomical structures, especially in the middle and lower thirds of the face.

To the orthodontist, facial perfection means facial symmetry, or the normal and proportionate development of facial contour dependent upon the corresponding development and growth of the underlying osseous structures and sinuses. This kind of facial perfection is an indisputable evidence of that perfection in the internal face which insures the proper performance of both the independent and the associated functions in the head. Again, abnormal or disproportionate development of facial contour means to the orthodontist a serious imperfection, because it is an evidence of deficient functional activity of the internal face; as a result of this deficiency or perversion

* The term "maxillary arches" is used to designate the bony structures of the maxillæ and mandible, inclusive of the alveolar processes and the teeth. The term "alveolodental arches" is used to distinguish that part of the alveolar process of the maxillæ and mandible which has developed during tooth-eruption.

of function, pathological changes in the tissues occur, which, if allowed to progress too far, seriously militate against the possibilities of normal development and growth of the associated structures of the head.

To show that such a sequence of impairment of function and structure in the internal face is not uncommon, we have only to cite the specialists who devote their entire time to guarding the organs of the special senses which, by the perversion of their functions, may cause pathological tissue changes, or which may themselves become the seat of inflammation and disease.

In view of these closely allied physiological and pathological relations existing between the functions of the organs of the internal face, the following propositions will be somewhat tentatively advanced and elaborated upon in this essay:

(1) Malpositions of the teeth, in general, are but objective symptoms of abnormal development of the maxillary arches.

(2) Concomitant arrest of development of the nasal structures and sinuses is associated with arrested or deficient development of the maxillary arches.

(3) Arrested or deficient development of the maxillary arches and the nasal structures is often a result of certain etiological factors which can be quite definitely diagnosed.

(4) The diagnosis and the early removal of adenoids or of other nasal obstructions which may be found in connection with this arrested function and development is the first step in the restoration of the normal function and structure of the maxillary arches and of the associated osseous structures of the nose.

(5) The further restoration of functional efficiency in the alveolo-dental and maxillary arches is brought about through orthopedic operation, by means of the anatomical development indicated by accurate arch-predetermination.

FIRST PROPOSITION.

The reader's attention is first drawn to the consideration of the first proposition, namely, that *Malpositions of the teeth, in general, are but objective symptoms of abnormal development of the maxillary arches.*

In order to lead up to the discussion of the abnormal development of the maxillary arches, let us first consider their physiological development, so that by primarily having a mental picture of the normal development of these structures we may the more easily comprehend their abnormal development and understand the point of view from which it is possible to formulate the first proposition.

Figs. 1 and 2 represent two models of the occluded teeth of a child at the ages of four and six years respectively, the second illustration exhibiting such increase in growth as is normal and commensurate with the development of the dental and maxillary arches at about the time of the eruption of the first permanent molars to occlusion.

In the two years the developmental spaces between the front teeth have successively appeared, one permanent central incisor having erupted in the upper arch and all four incisors in the lower arch.

The first permanent molars have erupted, and the increase in size and dimension of both arches is apparent.

The casts of the two upper arches in

Figs. 3 and 4 illustrate by comparison that the greatest increase in growth has the first permanent molar. Although not so easily apparent, the lateral develop-

Fig. 1.

Fig. 2.

Fig. 3.

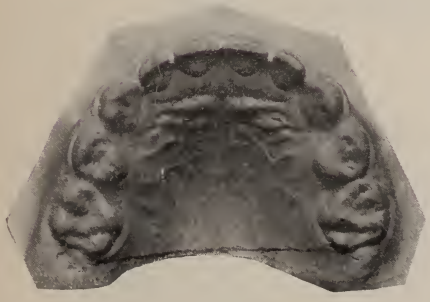


Fig. 4.

Fig. 5.

consisted of the lengthening of the dento-alveolar arch for the accommodation of ment is proportionate to the needs of the permanent teeth which are to erupt at

this period, the distance between the deciduous lateral incisors, which allows the eruption of the permanent central incisors, being accurately gaged in the natural process of development.

The alveolo-dental arches do not develop uniformly, but in sections corresponding to the teeth as they erupt at different periods. The incisal region, for example, increases in width at the time of the approaching eruption of the incisors of both arches, which lengthen at about the same time for the accommodation of the first permanent molars.

The subsequent eruption of the cuspids and bicuspids is in accordance with similar developmental processes which have been going on in the lateral halves of the arches anterior to the first molars. The greatest development of the arches after this period takes place in the region of the second and third molars as they erupt into their positions of occlusion.

Dr. Cryer, in his text-book on "Internal Anatomy of the Face," advances the theory that the mandible "grows by an interstitial process, each half having three fixed points between which the growth occurs, viz, the ramus, the mental foramen, and the symphysis menti."

Dr. F. B. Noyes, in the *American Orthodontist* for May 1908, takes exception to this theory. He says: "The jaws are endomembranous in their origin, but very early in their development a periosteum is formed over the surfaces of the bone already formed, and from that time on, the growth of the bone as an organ takes place through the functions of the periosteum, together with the articular cartilages and the peridental membranes. By these tissues the bone is built up, but by the periosteum the surface is sculptured and molded into form, and by the osteogenetic tissues inclosed within the surfaces of the bone the internal structure is constantly being rebuilt so as to adapt the organ to the forces to which it is subjected with the least possible weight. The more carefully this is studied, the more evident it becomes that bone is formed and reformed in response to mechanical stimuli, and that the entire surface is arranged in harmony with the mechanical stresses which result from the forces applied to the teeth and the surface of the bone."

This theory conforms to that of Walkhoff, who in his studies of the anthropoid apes shows that "Even the direction of the plates of the cancellous bone is arranged to support the strains to which the surface of the bone is subjected by the action of muscles, the force of mastication, etc."

Dr. Noyes sums up his entire paper by saying, "The adult maxillary bones, which are such important factors in the beauty and harmony of the face, are the result of the sum-total of all of the forces acting upon them," and that "Normal occlusion is the agency by which these forces are distributed and preserved in balance."

Whichever we accept, then, as a conclusive proof that the bone of the maxillæ is developed by the mechanical stress upon its surface, it still remains possible that in an arrested development of the maxillæ there is an insufficiency of nutrition of the bone-building cells, arresting their building function. The influence of this insufficient nutrition likewise exerts itself upon the developing teeth, but to a lesser degree, since in almost all cases of arrested development of the maxillæ the teeth finally

erupt, though in some form of malocclusion.

FIG. 6.

FIG. 7.

Malnutrition, then, due to various remote causes, is an etiologic factor which may cause arrest of the bone-development of the maxillæ to the extent that a dental arch is developed of a size that is insufficient for the accommoda-

tion of the permanent teeth; in such insufficiently developed maxillary arches the erupted teeth are crowded for space. Dr. Ottolengui aptly describes the condition as follows: "The irregularities of the teeth, and the consequent malocclusion, will be in nature and degree constantly related to the extent and time of the disturbance in nutritional functioning."

Dr. Cryer, in speaking of causes of malformation of the jaws, says: "It is, of course, to be understood that the factor behind these anatomical variations, leading to asymmetrical development, is *necessarily nutritional.* Some interference with local nutrition has brought about functional disturbance of a part, and this, in turn, a corresponding modification of anatomical form."

Any re-inauguration of development through treatment must be brought about by the nutrition of the maxillæ through an artificial stimulation of the bone-building cells.

In order to still further illustrate the fact that malpositions of the teeth are the result of arrested growth of the maxillary arches, we may note the positions of the permanent tooth-follicles at a period in child life when the deciduous teeth are unerupted, and compare the normal relative positions of permanent teeth with the arrangement of a more mature dental arch in which the teeth are in abnormal positions.

Fig. 5 represents the dissected tooth-follicles of the deciduous and permanent teeth in the mouth of a child three months after birth, the plastic tissues in the center of the illustration representing the periosteum covering the hard palate, the tooth-follicles being embedded and firmly adhering to the fibrous tissues laterally and anteriorly.

The tooth-sacs of the deciduous teeth are on the periphery, lying externally to the sacs of the permanent teeth and being larger than these. The arch of the deciduous teeth, which are nearly ready for eruption anteriorly, is very nearly uniform in shape and development, while the arch of the permanent teeth has at this age not yet assumed any definiteness of uniformity or position of its teeth, the four permanent incisors being more fully developed than the canines and bicuspids; the lingual position of the laterals, however, indicates that considerable arch-development must take place before these teeth have sufficient space to erupt into their normal positions in line with the centrals.

If, at this age or even later, up to the fifth or sixth year, infantile cachexia, *i.e.* malnutrition or perversion of function in the internal face, should occur, the resultant effect upon the arch of the permanent teeth might be such as is illustrated in the two casts shown in Figs. 6 and 7. These arches are reproduced from patients of seven and twenty-seven years of age, respectively. The positions of the central and lateral incisors are seen to be almost identical with those of the permanent incisor follicles in Fig. 5.

It will be observed that the canines in the adult arch of twenty-seven appear to occupy about the same embryonic positions in relation to the remainder of the permanent teeth as are noticed in dissections of the infantile skull a few months after birth. The rest of the permanent teeth in this adult arch form an arc no larger than that formed by the deciduous arch of the seven-year-old child shown in Fig. 6. In other words, judging by this macroscopic comparison, the adult maxillary arch has failed to develop beyond the age of seven years, or

even less—so great was the functional disturbance that left its impress upon the maxillæ and the overlying processes.

rested development, might be exhibited as further proof that malpositions of the teeth are symptomatic of arrested de-

Fig. 8.

Fig. 9.

This adult maxillary arch, then, presents the appearance of the embryonic maxillary arch in its retarded development—and, in this particular instance,

velopment in the maxillary arches; but the commonness of their occurrence in the practice of orthodontia renders these additional illustrations unnecessary.

Fig. 10.

in the position of its teeth. The maxillary arch is not sufficiently developed to allow space for the normal positions of the teeth.

Many similar illustrations of deficiency of the growth of the maxillary arches, varying only in the degree of the ar-

The precedence of development of the maxillary arches over that of occlusion of the first or second dentition leads to the following conclusions:

(1) Orthodontia must be viewed in regard to such early developmental processes as precede the occlusion of the

second dentition; under normal conditions these processes provide for the harmonious and proportionate development of the maxillary and dental arches, while in case of abnormal tendency they cause insufficient or disproportionate development in the same regions.

(2) If the development of the maxillary and dental arches and of related structures be normal, normal relations of occlusion are inevitable; if, through any cause, the development in these regions be arrested, the occlusal relations will be abnormal.

(3) Occlusion, normal or abnormal, depending, as we have seen, upon earlier developmental conditions, is not of primary import in the study of orthodontia, since it is governed entirely by certain developmental factors which precede the perfection of occlusion by several years.

SECOND PROPOSITION.

We now come to the second proposition, viz, *Concomitant arrest of development of the nasal structures and sinuses is often associated with arrested development of the maxillæ and dental malocclusion.*

In order to illustrate the fact that concomitant arrest of development of the nasal structures and sinuses is often associated with dental malocclusion, the photographs (Figs. 8 and 9) of the face of a child suffering from both malocclusion and arrested function and development of the nasal structures will be of interest.

The two pictures represent the face of the child at the ages of six months and seven years respectively, and close scrutiny will detect the undeveloped conditions of the middle third of the face directly over the nasal structures and sinuses. The child is a mouth-breather, and has been afflicted in this manner from early infancy, as the pictures show. A rhinological examination revealed narrow, undeveloped nasal passages; adenoids were removed at about the age of seven.

An examination of the dental and maxillary arches in Fig. 10 reveals considerable arrest of development.

Further ocular proof of the frequent association of undeveloped conditions in the maxillæ and the nasal structures may be plentifully furnished in the clinic of the orthodontia specialist, of whose patients at least fifty per cent. exhibit more or less aggravated symptoms of nasal troubles and adenoids.

Having taken cognizance of the association of the arrest of development of the maxillary arches and of the nasal structures, we naturally ask for the causes of the arrest of development. In the discussion of the third proposition, some of the more important etiological factors concerned will be presented.

THIRD PROPOSITION.

This third proposition is: *Arrested or deficient development of the maxillary arches and the nasal structures is often the result of certain etiological factors which can be quite definitely diagnosed.*

To avoid unnecessary generalization, the subject of this paper has been limited to a discussion of certain etiological factors which are primarily the cause of arrested development of the maxillary arches and associated structures in those cases in which such general causes as heredity, and such local causes as the premature loss or prolonged retention of deciduous teeth or any adverse mechani-

cal forces of occlusion, are not active in the perversion of the function and the development of the dental arch.

These causative factors may be either prenatal or postnatal, affecting the development at any period of the life of the organism.

It is conceded that prenatal influences —of the nutritional, the functional, or the nervous type—have a definite bearing upon the metabolic processes which determine the total or partial symmetry or asymmetry of the embryo.

Hare-lip and cleft palate are recognized simply as a lack of complete development in the embryo due to some retardation in the intra-uterine development, the causes of which are obscure only because of our inability to directly trace the particular influences that might arise from neurotic or other tendencies which in turn affect the development of the cellular structures in the parts of the human organism peculiarly open to such influences.

Talbot remarks: "The structures of the mouth and nose being exceedingly variable in evolution, and the structures of the jaws and teeth having taken an embryonic trend for the benefit of the body as a whole, under the law of economy of growth, disturbances of balance are peculiarly apt to occur here. Not only is actual growth upset by the operation of this disturbance, but certain potentialities are likewise interfered with. In dealing with the development of the palate, both pre- and post-congenitally, the relations of the hypophysis, or pituitary, have to be taken into account, since it has been well demonstrated that this body exerts an influence over body growth and structures thereto related. Strain on the development of the hypophysis after birth can not only produce undue growth of bone, but can also check development of it."

Whatever the particular stress may be which lowers the potentiality or retards the development in the embryo, although we may not be able to diagnose it, it is enough to know that such influences exist and invariably affect the development of particular parts of the organism to a greater or less degree.

Sajous, in his work, "The Internal Principles of Medicine," claims for the pituitary bodies the control of all oxygenation processes in the body, and it is more generally acknowledged that the hypertrophy of these organs is accompanied by acromegalia, a disease characterized by enlargement of the bones and soft parts of the hands, feet, and face. In dwarfs the pituitary body is found shrunken and wasted, which would seem to prove that it has a profound influence over bodily growth and development.

Sajous indicates the significance of these organs and their physiological and pathological importance in the following sentences: "It will be apparent that any lesion capable of blocking the afferent and efferent impulses that traverse it at all times, and which represent the aggregate of the organism's inciting and governing energy, must necessarily compromise life, or the functions of an organ to which the blocked nerves are distributed. The large mortality under chloroform adenectomy is in all probability due to the shock conveyed to the posterior pituitary body through the foramen lacerum medium immediately over the lymphatic enlargements. It will be readily seen, therefore, that whatever interferes with the nutritive functions at the vault of the pharynx may disturb the subsequent development of the whole skull and its contents."

The inferior opening of the foramen lacerum medium lies in the adenoid region, and it has been suggested by Dr. F. Parke Lewis that the vessels which enter it are very apt to be impinged upon by hypertrophy of the pharyngeal tonsils, and that the cutting off of the nutrient and nerve supply to the pituitary bodies materially affects the proper performance of the function of these organs, with consequent disturbance of the development of the internal structures of the skull, as well as of the whole organism.

Again, it has been suggested by Dr. Woods Hutchinson and by the late Dr. Harrison Allen that some of the extraordinary dwarfing and growth-retarding effects of adenoids might be due to a reflex influence exerted upon the pituitary body.

Whatever the particular manner in which adenoids affect the development of the structures of the internal face, it has been observed that both the nasal structures and the maxillæ are insufficiently developed in severe adenoid cases, and the early removal of these obstructions to nasal breathing has greatly assisted in restoring the normal conditions of the internal face.

FOURTH PROPOSITION.

It has been stated in the fourth proposition at the beginning of this paper that *The diagnosis and early removal of adenoids, or other nasal obstruction when present, in cases of arrested function and development of the maxillary arches and nasal structures is the first step in the restoration of normal function and structure of the maxillary arches and the associated osseous structures of the nose.* Now, it may be asked, Is there any particular benefit to be gained from the early removal of these disturbing factors?

The answer is simple enough. If the adenoids are removed at an early stage, their effects upon breathing and upon the development of the maxillæ, of the nasal structures, and often of the whole body, are immediately eliminated, and the return to normal growth and function is very marked. Mouth-breathing disappears; the function being restored, the nasal organs begin to develop, the mental hebetude disappears, the child gains in weight, etc.

It happens only too often that adenoids are neglected until their effects are so marked that their late removal does not yield the best results in post-operative development of the surrounding structures.

To illustrate this: The four pictures of the child in Figs. 11, 12, 13, and 14 exhibit the effects of mouth-breathing from adenoids and enlarged tonsils at the ages of two, five, eight, and ten years respectively. During all these years the evil effects of mouth-breathing were at work; the child's hearing was impaired, she was undersized, had a poor appetite, her respiration was obstructed; in fact, she presented all the worst features of the habitual mouth-breather.

The trouble could have been diagnosed at the age of two, and an operation at that time would most likely have resulted in the permanent disappearance of all the effects of mouth-breathing on the general system and on the development of the maxillæ and the nasal structures.

The model in Fig. 15 represents the occlusal relations of the teeth of the patient at the age of ten, when she presented herself for treatment. This is

a typical case of a mouth-breather of class III of Angle's classification; the maxil-

Fig. 11.

lary arch is undeveloped and the front teeth of the mandible are inclined back-

The upper dental arch being in lingual occlusion has tended to unduly widen the

Fig. 12.

mandible, owing to the perverted influence of the inclined cusp planes.

Fig. 13.

ward as a result of the abnormal muscular action of the lips.

Fig. 14.

A most striking illustration of the arrest of the development of the maxilla

Fig. 15.

Fig. 16.

is furnished by a comparison, in Fig. 16, of this case with the four-year-old patient in Fig. 3; it is evident that the maxilla of the ten-year-old child is no more fully developed than that of the child of four.

The etiological factor in this case is plain, and its disregard casts a serious reflection upon the family physician who attended the child during its infancy and youth. Even a physician of very little experience might have foreseen the evil effects which the adenoids must have upon his patient.

When the patient came under my care the parents were easily induced to have an operation performed for the removal of the adenoids and of one tonsil which was very much hypertrophied. The fragments of the adenoids and the one tonsil may be observed in Fig. 17. As an immediate result of the operation the child's impaired hearing was noticeably improved, and the earaches from which she had suffered have not returned.

The malocclusion of the patient's teeth, which is still under treatment, is considerably handicapped in its progress toward the normal relation because the bony structure of the maxillæ seems to have become changed, by the long continuance of inflammatory conditions in associated structures, in such a manner that they will not readily respond to the stimulation of arch-expansion, the osseous structure being no doubt unduly hardened. The teeth in this young patient seem as difficult to move as those of an adult, in whom the denser structure of the more mature maxillæ imparts greater resistance to the tooth-movement than the usually pliable maxillæ of the child would offer.

Since these functional and structural changes in cases of this character are liable to assume such proportions that a late operation for the removal of the nasal obstructions and for the correction of the malocclusion does not guarantee the greatest benefit to the patient, the early diagnosis and removal of adenoids or of other nasal obstructions, and, if possible, the immediate correction of the malocclusion, are imperative.

How early, it may be asked, should adenoids be removed?

FIG. 17

According to rhinologists, they should be removed as soon as they are noticeably enlarged and capable of doing damage in perverting respiration, etc. Extremely hypertrophied tonsils and adenoids have been removed from two-year-old children. If such extreme conditions exist at the age of two years, this age is none too early for removal of such agents as pervert the functions and inhibit growth and development. In the author's own experience, the early removal of adenoids has afforded the best results in restoration of occlusion, in normal breathing, and in the development of maxillary and nasal structures.

To quote from Dr. Woods Hutchinson's essay on adenoids: "If, however,

they have been neglected too long, so that the child has passed the eighth or ninth year before any interference has been attempted, and still more, of course,

Fig. 18.

if it has passed the twelfth or thirteenth year, then only a part of the disturbances that have been caused can be remedied by their removal."

FIFTH PROPOSITION.

We now come to the consideration of the next step in the restoration of the normal growth and development of the associated structures of the mouth and nose, and of the developmental possibilities of the dental and maxillary arches which may have been arrested in development through any of the causes mentioned, especially by adenoids and mouth-breathing.

The further restoration of functional efficiency in the dental and maxillary arches is brought about through orthopedic operation, by means of the anatomical development indicated by accurate arch-predetermination.

Until a few years ago, any partial or total interference with the arch of the deciduous teeth was considered impracticable or even detrimental to the development of the permanent teeth.

Fig. 19.

Fig. 20.

"It is no uncommon thing to have a child of seven jump three to five inches in height, six to twelve pounds in weight, and one to three grades in his schooling, within the year following the operation." (*Saturday Evening Post*, April 4, 1908.)

One text-book, published in 1898, states that correction of the irregularities of the teeth might be undertaken as early as the eighth or ninth year, limiting such operations to the labial, lingual, or torsal movements of single

erupting or erupted teeth of the permanent set.

At the present time it is considered not only advisable, but imperative, that in cases of arrested development of the dental and maxillary arches evident to the trained observer, the alveolar and maxillary processes should be stimulated to development by arch-expansion before the loosening of the deciduous canines and molars at the age of six or seven years, or even earlier.

The lack of mesial and distal spacing between the deciduous incisors and canines at about five years of age is a very certain indication of a lack of anterior development necessary for the proper eruption of the permanent teeth in the incisal region.

If the deciduous arch needs widening, it is better to perform this operation some little time before the roots of the deciduous molars have begun to be absorbed, since the crowns of the permanent bicuspids are inclosed within the roots of the deciduous molars, and as a result of the expansion the crowns of these permanent teeth as well as the deciduous teeth and surrounding alveolar tissues will be moved into a larger arc, at the same time affording a gentle stimulus to the normal development of the arch.

If the treatment be delayed until the time just before the deciduous molars are shed, the almost absorbed roots of these teeth can afford no resistance to the appliance for expansion, and the deciduous crowns will be shed before any expansion can be accomplished in this region. This will delay the widening of the arch until the permanent bicuspids are fully erupted, there being no other means of anchorage in the meantime except the deciduous canines, which are often prematurely lost.

It is reasonable to suppose from the rapidity of development of the alveolar process during the primary stages of the eruption of the permanent teeth, that shortly before the period when the absorption of the roots of the deciduous canines and molars is about to begin, the movement of the deciduous teeth conforms most nearly with the natural and physiological process, and that the amount of absorption of the alveolar process before the teeth are moved is comparatively slight, the change in these structures being analogous to the natural developmental changes which would take place if no arrest of development had occurred.

Figs. 18, 19, and 20 illustrate a case of a nine-year-old patient of class II, division 1 of Angle, in three different stages—before treatment (Fig. 18), after shifting of the occlusion (Fig. 19), and after the eruption of the permanent teeth (Fig. 20). About four years ago, the author presented this case as illustrative of the ideal treatment of the first division of class II at an age when the deciduous canines and molars were firm in their positions and capable of being moved without harm.

The case was carefully retained and watched until the permanent canines, bicuspids, and second molars were erupted as seen in the cast on the right (Fig. 20), the idea being that such care would insure more permanent results, especially after the locking into occlusion of so many additional cusps of the permanent teeth.

Although at the present time the treatment might have been carried out according to the predetermination of the sizes of the dental arches as illustrated in the next case, the results were very satisfactory; and the writer still carries

out the idea of retaining and watching the cases treated at such an early age until the permanent teeth have erupted into occlusion.

The facial profile of the patient before and after treatment, in Figs. 21 and 22, exhibits a most pleasing change of contour as the result of the occlusal changes just illustrated.

The line drawing of the predetermined arch is transferred to a piece of transparent celluloid, and by placing this in position over the occlusal surfaces of the teeth of an upper or lower cast of the case before treatment, the extent of expansion and the change in the shape of the arch laterally and anteriorly is very plainly indicated.

FIG. 21.

FIG. 22.

An accurate conception of the normal size and shape of the dental arches in malocclusion is no longer a matter of guesswork, since the mechanical and anatomical reconstruction of the arch has been rendered possible by the application of the laws of Bonwill in the synthetic reproduction of the normal arch for any given case, as worked out by Dr. C. A. Hawley, who by a reversal of the method of triangle construction of Bonwill, has succeeded in predetermining the size of the arch by constructing a triangle from a primary measurement of the arc of the permanent centrals, laterals, and cuspids.

Fig. 23 illustrates the arrested development of the upper arch of a child of nine years of age, in which the deciduous canines and molars are still intact and firm in their positions, and capable of offering resistance to an appliance for the lateral expansion of the arch, and of carrying with them the crowns of the permanent bicuspids and the surrounding alveolar structures.

Although the permanent central incisors and first molars have erupted, as far as the development is concerned it is still a deciduous arch, and the diagram for a 0.39 central indicates that considerable anterior and posterior expansion is

Fig. 23.

Fig. 24.

necessary in order to secure sufficient development for the accommodation of the permanent teeth which are yet to erupt.

The result of the treatment of this arch instituted according to these indications is exhibited in Fig. 24, in which the extent of development is measured by the diagram of the predetermined arch. The further development of this arch velopmental conditions, is illustrated in three successive stages in Figs. 26, 27, and 28. The case was that of a seven-year-old boy, a mouth-breather. Considerable adenoid tissue was removed from the naso-pharynx by the rhinologist, and after a few days of recuperation from this slight operation the artificial development of the dental arches and

Fig. 25.

can safely be intrusted to nature, provided that the amount of development already gained is effectually retained as long as possible before the eruption of the permanent canines and bicuspids.

The retention of this arch is illustrated in Fig. 25, the deciduous teeth being utilized for resistance until the time when the absorption of their roots will render them unfit for such use.

One case treated by the author, which is most important in its bearing upon de- restoration of normal occlusal relations was begun.

The upper cast of the model in Fig. 26 exhibits the closing of the space for the permanent lateral incisors, and the lower cast the premature loss of the deciduous canines and the consequent closing-up of their space; both casts in occlusion exhibit the full distal occlusion of the lower arch which is distinctive of the first division of class II, Angle's classification.

Treatment was inaugurated by first expanding the dental arches, opening up spaces in the upper arch for the perma-

Fig. 26.

After eight months' time had been consumed in these operations, the procedure of which was slow and gradual

Fig. 27.

nent laterals, and for the canines in the lower arch.

When this treatment had progressed sufficiently far, intermaxillary elastics were applied extending from hooks upon the upper expansion arch to the distal ends of the tubes upon the lower molar clamp bands, in order to effect the shifting of the occlusion from distal to normal.

in order to simulate a natural developmental process, the conditions in the two arches appeared as shown in the model in Fig. 27. From diagrammatic measurements taken at this time it was found necessary to still further expand both arches; the final result in occlusion is seen in the cast, Fig. 28.

Fig. 28.

The Hawley chart for a 0.39 incisor called for an arch the size of which if

compared with the one first obtained may be seen by a study of the superimposed diagrams in Fig. 29, the cast at the left representing the first result and that at the right the final result of arch-expansion. Especially in the molar region the lateral development at the end of the first period of treatment did not seem proportionate to that produced in the anterior part of the arch.

The expansion of the lower arch was carried out without measurement, following the upper arch as a guide in the extent of the expansion to be accomplished. Figs. 30, 31, and 32 illustrate the same three stages of progress as were shown in the upper arch.

The scientific value of this method of arch-predetermination could not be better illustrated than by this case, in which, in all probability, the expansion indicated by the diagram would not have been carried out to such an extent if the normal size of the arch had not been predetermined.

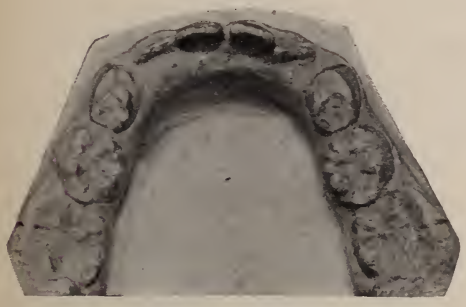
The "before" and "after treatment" pictures (Figs. 33, 34, 35, and 36) were taken eighteen months apart, and the development of the middle as well as the lower third of the face is no doubt due to the stimulus to normal growth resulting from the treatment described.

Such a series of operations as were performed upon this seven-year-old boy cannot fail to be of the greatest benefit in the restoration of the normal func-

FIG. 29.

tion and growth of the dental and maxillary arches through scientific arch-expansion and occlusal restoration following

Fig. 30.



the removal of the chief causative factor, the post-nasal obstructions.

The maxillary arches and the nasal structures are so closely associated that

Fig. 31.

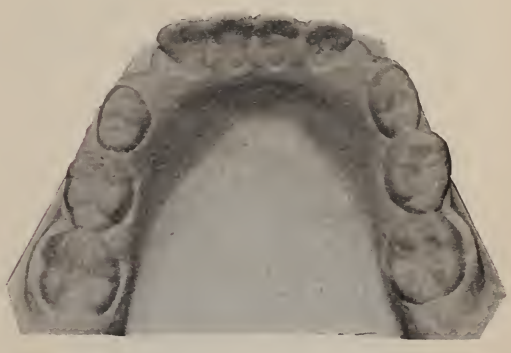
any altering of their relationship in order to permit the normal function of the one is sure to be of benefit in the development of the other.

"When the contour of the arch upon which the brain-case rests is altered by an expansion of its base, or by a change in its basal curve, every buttress and flying buttress is modified by this variation as a direct consequence. The keystone of the skull is the sphenoid. If we modify the base against which the corner-stone rests we are altering a series of contingent relationships; we are modifying the nutritional supply as it is carried to one side or the other, permitting or interfering with—if we begin while the tissues are still plastic—symmetrical development of the head, and changing the structural conditions of the mouth, the nose, the face, the orbit, and the eyes, and through these the brain functions, and ultimately the brain itself, and therefrom every bodily function and tissue." (F. Parke Lewis.)

CONCLUSIONS.

To draw, now, the conclusions from the five propositions stated at the beginning, which prompted the title of this paper, we must infer that the causative

Fig. 32.



factors of arrested development of the dental and maxillary arches are of more than historical significance in the treatment in orthodontia.

In every case of malocclusion the causative factor is to be taken into consideration, whether it be the premature loss of deciduous teeth, their prolonged retention, the loss of permanent teeth by extraction, etc., or whether this factor be of a trophic nature of prenatal

or postnatal origin and of various obscure sources.

Fig. 33.

Fig. 34.

How much more important to the diagnostician becomes the etiologic factor in cases of malocclusion and arrest of development of the dental and maxillary arches associated with improper function and arrest of development of the nasal structures, when, as has been shown, by the removal of the cause, followed by dental and maxillary development, such profound changes in nutrition, growth,

Fig. 35.

Fig. 36.

and function of these associated parts of the head are brought about!

The association of nasal stenosis, mouth-breathing, and arrested development of the maxillæ, including dental malocclusion, is an evidence of the interdependence of function and structure in these associated organs sufficiently strong to convince the most skeptical of the importance of such a study of the physiological and pathological anatomy of the internal face, with a view to the discovery of these causative factors, as will assist in the alleviation or in the cure of abnormal developmental conditions that require an intelligent differential diagnosis.

From the earliest infancy to old age, the problems of malocclusion are problems of abnormal development, the etiological study of which alone reveals the inception and the causative factors of the resultant malocclusions.

Discussion.

Dr. H. A. Baker, Boston, Mass. Gentlemen, we have listened to one of the best papers I have ever heard. Dr. Pullen has given us ideas that afford great food for thought. I should like to discuss this subject for an hour, but I shall take up only a few minutes and merely touch on two or three important points. The essayist speaks of prenatal and postnatal development. There is no question that prenatal maldevelopment may exist. It is well known that cleft palate is due to a lack of development in fetal life, and there is no reason why it should not be so in other conditions. As to postnatal development, I think that one important or vital point is very often overlooked. I refer to the fact that there is not one child in ten that gets its nourishment *properly;* not one in ten gets its nourishment *normally,* and of bottle babies, not one in twenty gets its nourishment in the proper way. The benefits of Fletcherism in adult life cannot be compared with those in infant life. Most bottle babies get their food from a nipple with a hole so large that you can almost pour the food down their throats. What is the result? There is no stimulation by virtue of the exercising of the organs of mastication. I have a little grandchild whose father is a crank on Fletcherism and also on the question of bringing up children, and that is why I speak of this. This child is a bottle baby, to be sure, but gets its nourishment through a hole in the nipple that is so small that the child has to labor to get any milk, and it usually takes her a half-hour to get the milk out of the bottle, thereby strongly developing the jaws.

One other point that I should like to speak of, which struck me very forcibly, is Dr. Pullen's method of treating undeveloped cases, in which I fully agree with him. I have said in public meetings that the day would come in the practice of orthodontia when the treatment would be preventive rather than corrective, by treating the children when they are young. We all know that in treating a case before the permanent teeth are erupted—if for instance we have anchorage on the molars and centrals, to bring the bicuspids into occlusion—we do not have to retain them if we bring them into occlusion; they retain themselves by interlocking. Where you have the permanent teeth erupted and out of occlusion it takes at least two years of retaining to hold them in position. From this, my experience, I agree with the essayist in the method he refers to in bringing these permanent teeth into approximate

relation for proper occlusion by expanding the arches containing the deciduous teeth before the roots have begun to be absorbed.

Dr. Richard Summa, St. Louis, Mo. When disease or abnormality is recognized the first and most natural demand is that of a treatment which produces ease or normality. Hence the first interest manifested in any ailment consisted in suggestions of more or less empirical remedies. After some measure of relief had been obtained by these empirical means, a pathology for the abnormality was sought and sometimes found. Finally an etiology was sought, and sometimes glimpses of it were caught. The etiology of any disease or abnormality admits of a great deal of speculation, and the etiology of malocclusion forms no exception. Etiology being the weakest feature of orthodontia of the present day, contributions along this line by one possessing the ability and experience of Dr. Pullen are welcomed by everyone interested in this branch of dental science.

Since Dr. Pullen and I belong to the same class of orthodontists—occlusionists—we naturally observe from similar points of vantage. I believe that the tooth is the initiative for the existence of the calcified jaws. I believe also that every step in the development and growth of the jaws and teeth tends to reach that one goal, namely, occlusion of the teeth, which alone permits these organs to exercise the functions for which they were created. These two thoughts from my *credo* do not differ, I think, from Dr. Pullen's beliefs.

The essayist states, "Occlusion whether normal or otherwise, being thus dependent upon earlier developmental conditions, is not the factor of prime import in the study of orthodontia, since it is governed entirely by certain factors in development which precede its attainment by several years." This is a good thought, concisely expressed, and while no one can dispute the fact that malocclusions are practically established before the permanent teeth erupt, yet I still consider occlusion as the prime factor in the study of orthodontia, because it is the tangible manifestation of the arrested development of the jaws and contiguous parts. It is occlusion that presents to the orthodontist the possibility of remedying such orthopedic defects.

In the plan of nature all teeth, while their crowns are being developed, lie in crypts within the jaws. It is during this period that forces external to them exert a great influence over the molding of the jaws. These forces are atmospheric pressure and muscular tension. These two agents act normally or abnormally, according to whether the nasal tract is clear or obstructed. The instances in which lip or tongue habits pure and simple cause a perversion of muscular tension are few. The tooth in course of eruption is guided to its position by these external forces. It seems therefore quite appropriate that the essayist should in such a forceful manner call attention to the necessity of removing nasal obstructions. Nevertheless, we must not lose sight of the influence which occlusal contact of the teeth exerts upon the growth of the jaws to their final shape.

Every occlusal impact is recorded in the build of the jaws. This is plainly shown in typical cases of class II, division 1, and class III, Angle classification of malocclusion. In the former we meet undeveloped chins because of the lack of proper occlusion of the anterior

teeth; in the latter class of cases we find overdeveloped chins in consequence of the excessive forward impact against the teeth of the lower arch, and not alone is the functional result of the teeth recorded in the jaws, but, as Dr. Pullen so ably argued, it also makes its imprint upon the adjoining and adjacent osseous structure of the face, and this bony framework constitutes the prime factor of facial expression.

Dr. Pullen correctly suggests that the embryonic position of the permanent teeth needs but a slight perversion of external forces to throw them into confusion during their eruption. I have often wondered if the regular or symmetrical embryonic alignment of the deciduous teeth does not offer an equally plausible reason for the relative freedom from malocclusion met in the deciduous dentition.

I deem it a cause for rejoicing that our medical brethren are rapidly withdrawing their fossilized objections to the early removal of nasal obstructions. Orthodontists deserve a great deal of credit for the part they have played in calling the attention of the laity and medical profession to the intimate relation existing between malocclusion and nasal obstructions. In this matter the orthodontist becomes an indisputable benefactor of mankind. The warning and preventive measures suggested as to the removal of nasal obstructions is of prime importance for the production of a healthier race. The incidental benefits of facial beauty that are derived from orthodontic procedures dwindle into insignificance when compared to the health bestowed upon mind and body.

Dr. Pullen refers to an article by Dr. Woods Hutchinson, which appeared in the *Saturday Evening Post*, April 4, 1908. I cannot pass this reference without saying that this article, which is one of the rare gems written in popular style, places many scientific facts within the reach of the general public, and is therefore destined to do much good.

This paper abounds in practical suggestions, and to give appropriate credit to each of its items would mean a repetition of the entire paper.

Dr. S. Merrill Weeks, Philadelphia, Pa. I consider it a distinct honor to be asked to discuss a paper presented at a meeting of this association, and I accepted this honor with some pleasure, as it is a well-known fact that the essayist has the well-deserved reputation of giving us papers of unusual merit. Not being satisfied with treating a subject from a superficial point of view, he delves into the basic principles upon which only we can arrive at the truth. There are perhaps not many other branches of our profession in which these principles are so deeply seated, obscure, and difficult. In the last decade undoubtedly great progress has been made in the treatment of irregularities, but it seems to me that this may not be of any greater importance than the determination of those factors which have to do with the cause of irregularities. It is for this reason that I feel we may congratulate ourselves on having had this paper, in which the essayist has so ably treated these factors.

There are only a few phases in this paper to which I would call your attention. The essayist's proposition that—"Malpositions of the teeth in general are but objective symptoms of abnormal development of the maxillary arches as a whole," is very valuable, and in the treat-

ment of this thought he has brought out many ideas, to none of which I can take exception.

The point that I wish to make in this connection is that there may be some cases in which the divergence in the order of eruption of the teeth, or in the initial positions of the tooth-follicles, may be the cause of an arrested development of the maxillary arches. This I suggest because of some few cases observed in which no other part of the anatomy could be detected in which there was a lack of development. I believe that the mechanical phase of the eruption of teeth, that is, the wedging of the larger permanent teeth into spaces previously too small, has a great deal to do with the development of the maxillary and the alveolar arches, and it can readily be seen that any interference with this process by the misplacement of the tooth-follicle or the abutments afforded by the approximating deciduous or permanent teeth could easily prepare the way for this condition. This idea is in a measure sustained by the statement of the essayist that the maxillary arches do not develop uniformly, but in sections corresponding to the teeth erupting at different periods. This is also plainly to be observed in the development of the prominence which is caused by the eruption of the upper canine after the approximating abutments have been substantially fixed.

The third proposition, that the arrested or deficient development of the maxillaries and nasal structure is often the result of certain etiological factors of prenatal or postnatal origin which are capable of quite definite diagnosis, is one which at the present time I do not feel able to discuss, but I feel that this phase is perhaps the most important of the paper, since the clear elucidation of the phases involved will enable us to better diagnose and prevent many of the distressing conditions which now confront us. I am sure that the essayist does not feel that his investigations in this direction are complete.

In reference to the treatment of developmental deficiency, I wish to say that I thoroughly agree with the idea that it should be gradual and careful, so as to offer nature an opportunity to assist in the process in such a way that the result may be more satisfactory and permanent.

In closing my discussion, I wish to say in reference to the predetermination of the dental arches, that if we carry out the essayist's idea to the letter, we might in my opinion interfere with the normal development of race types, of temperament, and also of family facial characteristics. By this I do not mean to minimize the value of the essayist's idea, but rather to encourage a more careful study of its adaptation. If it should be possible to extend this principle to the relation between the deciduous and the permanent teeth, we should be even more fortunate.

Dr. S. H. Guilford, Philadelphia, Pa. I have listened, of course, with a great deal of pleasure to the paper presented by the essayist, and I agree with many things that he has said. I regret, however, that in quoting me he referred to a work that I published ten years ago, instead of quoting from the later edition of only three years ago. Many things that I advocated ten years ago I would not advocate today, because the science of orthodontia has since then so materially changed. Similar advances have been made in dentistry as in medicine, the prominent idea being the prevention of disease or disfigurement rather than its remedying after it has been estab-

lished. In no department of dentistry is this more manifest than in orthodontia. We realize today that those who lived forty years ago and undertook the correction of irregularities made the mistake of not only allowing the condition to occur, but to be confirmed before they began to change it. They were partially unsuccessful because they did not have certain methods and appliances that we have today which aid us very materially. After changing the position of the teeth, while the mouth was undergoing a change, they had no practical method of retaining the teeth in such a way that they would not go back into their old positions.

We were not able to do that until we were given a very simple device and method by Dr. Magill, who was the first to suggest cementing metal bands on the teeth in position, and the attachment to those bands of wires or other attachments that would retain the teeth in position. I mention this simply to show that the old methods cannot compare with the new ones, and that many things which are known today were not known then.

Today, in my opinion, but few dentists who are interested in this subject do not realize the importance of correcting any irregularity as soon as it is brought to their notice. Thirty years ago, shortly after the introduction of the Magill band and after the demonstration of the advantages afforded by its use, I was severely criticized on many occasions because I undertook to correct irregularly placed teeth before the permanent teeth had come into position. I was regarded as an extremist because I advocated that if any of the permanent teeth erupted irregularly they should at once be moved into their proper positions, and should be held there. Today, every orthodontist acknowledges the wisdom of such a course and carries it out in his practice.

The essayist speaks of the importance of recognizing the existence of adenoids in the naso-pharynx, which is certainly one of the most important things to be considered. In every case of irregularity we should try to ascertain the cause or causes that have been responsible for the condition, and if possible remove them. In the case of a child whose teeth are erupting irregularly, we should ascertain whether this is due to a lack of development of the facial structures caused by a factor interfering with the natural breathing of the child, and if such is the case the conditions should be so changed as to allow nature to resume her functions and assist in bringing about the normal enlargement of the dental arches.

The essayist has spoken of the importance of using the deciduous teeth for the purpose of resisting strain, or of gradually enlarging the arch, before the roots of the deciduous molars have been resorbed, so that in the moving of the teeth we shall also move the tissues around them, and with them the germs of the permanent teeth situated between the roots of the molars. This is certainly important.

As to the question of how soon we shall undertake the correction of any irregularity, I do not consider it advisable to interfere until we find that an irregularity is threatening, and we do not know this until some of the permanent teeth are beginning to erupt. We need not wait until they have entirely erupted, but as soon as we find that the arch is not large enough to accommodate the teeth which are struggling to take up their places we should begin with our treatment, for such treatment will be the more

simple the earlier the age at which it has been begun.

Dr. R. Ottolengui, New York, N. Y. I feel embarrassed in discussing a paper that I have not heard. Unfortunately, I was engaged in one of the committee rooms, and had been informed that this paper would be held over until this evening. I gathered, however, the general trend of the paper and I can discuss one phase of it, namely, that we must not stop at the correction of irregularities and the alignment of teeth; for this is not the entire limitation of the new, grand science of orthodontia. Just as the general practitioner is beginning to feel that the larger field of his usefulness lies in the direction of preventive dentistry, as he recognizes that an unclean mouth and unclean habits in the individual are precursory of caries and of the loss of the teeth, just so the modern orthodontist has come to recognize definite signs which indicate with absolute certainty the approach of malocclusion of the teeth. It therefore becomes his duty to immediately advise the parents, that interference is necessary for the welfare of their child, and that he should be put under the observation of the orthodontist from the age of four or five until the age of twelve or fourteen. I wish to point out to you this fact—that by such practice you are treating the child during the age when he is most easily managed, and that you finish up where the orthodontist of the past formerly began. By this practice of early interference the great problem of retention is practically solved, because the retainer is the alveolar process. Moreover, you avoid a great difficulty which always attends the later care of children; for a child, as he grows older, becomes more of an individual, and that individual reaches the point where he is more able to say, "I will" or "I will not have this done." In early life, however, you can manage the child so that you can accomplish your aim; moreover, movement at that time means the introduction of forces encouraging development, which is much easier than the later application of force for a similar purpose. As an exemplification of this thought I wish to touch on one point which has been brought out by one of the previous speakers.

Unless I have misunderstood the last speaker, he has intimated that we must wait for some of the permanent teeth to come into position before we can determine any irregularity. This is not literally true. If we carefully observe our young patients we shall often find by first examining the profile that the chin sets too far back for symmetry; then if we examine the anterior portion of the mouth we find that in many cases the upper canines and incisors completely overlap and cover the teeth of the lower jaw when it is closed. A subsequent careful examination of the molar occlusion will indicate that there is a slight, or more than slight, distal relation of the lower jaw. There may be a lack of development in the premaxillaries in the upper jaw which is keeping the space between the canines too narrow, and these canines and the long overbite of the anterior teeth are preventing the longitudinal development of the mandible. If such a condition be left to itself it will also interfere with the normal vertical development of the teeth in the molar and bicuspid region, and you will have those unfortunately very common cases where it seems that the incisors of the lower jaw have grown too high and are biting against the roof of the

mouth, while the upper incisors are protruding, a typical case of class II, division 1, of the Angle classification. If you encourage at that period the widening of the upper arch, you will not be compelled to do very much to the mandible, because by simply releasing it from imprisonment you enable the longitudinal development to continue. But if you find that there is a lack of development of the lower jaw, it often becomes necessary to employ slight force in order to widen that jaw also, and you will find that by just that little help the teeth will be guided into erupting to normal occlusion, and that in this way we can prevent one of the most troublesome cases that we have to deal with—class II, division 1, or the so-called prominent upper jaw.

What is the reverse of this proposition? Suppose you postpone treatment until the child has reached the age of twelve or fifteen; if we then force the upper incisors back to their normal position in the normal arch, and if we move the lower arch forward so as to establish relatively normal occlusal relations, we may frequently find the bite open in the distal portion of the mouth. It is certainly more difficult to elevate the bicuspids and molars to their normal relations to the occlusal plane than it is to rearrange such a mouth and to make the teeth erupt normally in their vertical development by making the correction at an earlier age. I believe that the essayist has presented one of the papers tending to make orthodontia an art which is finished instead of begun at the age of twelve.

Dr. PULLEN (closing the discussion). In closing the discussion, I wish to read a little clipping from the *Dominion Dental Journal* on malnutrition. It is an extract from a report compiled by a board of educators who investigated into the health of the school children in many of our large cities. It states that "Out of six hundred thousand school children in the city of New York, four hundred and sixty-five thousand eight hundred were physically deficient. Of this number two hundred and thirty thousand eight hundred suffered from defective breathing, one hundred and eighty-seven thousand from enlarged glands, and forty-eight thousand from malnutrition. The proportion is as follows: Enlarged glands, 48.8 per cent.; bad teeth, 72.4 per cent.; malnutrition, 12 per cent.; eye defects, 14.4 per cent.; nose troubles, 27.7 per cent., and throat troubles 29.9 per cent. The report arranges the physical defects into diseases of the nose, throat, eyes, teeth, and glands, but attributes to malnutrition only 12 per cent. of the cases. The actual fact is that malnutrition is the direct cause, and the various diseases specified are only symptoms of the poorly nourished condition, just as fever, coated tongue, nosebleed, vomiting, and purging are symptoms of typhoid fever. Malnutrition, the gaunt handmaid of poverty, insidiously invades the body of its victim, and, breaking down all protective barriers, leaves the body defenseless to the ravages of disease."

Dr. Baker spoke at some length of the proper performance of the mammary function, and I can only indorse his remarks on that subject.

Dr. Summa spoke of the occlusion of the teeth as being of primary import in orthodontia, but I do not think that he fully understood the relation in which I made the statement that "occlusion is not the factor of primary import." Occlusion of the teeth comes as the end

of all developmental processes in the dento-alveolar arches, and I simply wished to call attention to the fact that we must consider many other things before we come to occlusion, such as development of the maxillaries and of the alveolar processes before the teeth have erupted to occlusion. I did not, however, intend by my statement to detract from the importance of occlusion in orthodontia.

As to Dr. Weeks' remarks in regard to the artificial overdevelopment of the arch preventing attainment of the racial types following the Hawley diagrams, I should say that we do not carry it to that extent, and I hardly believe that it is possible for us to do so. In the first place, the teeth retain their individual type, and in our operations toward the restoration of the normal jaw, and especially in developing the arches, our retainers are removed, and influence will at once be brought to bear upon the normal and natural changes that represent that type of individual. We do not harness the jaw and hamper it to the extent of changing the racial type.

This paper is not intended to represent the final word on this subject, but simply to illustrate the trend of thought of many specialists working along this line in this country. Attention has been focused heretofore entirely upon the teeth in their malpositions without any consideration of the relationship between the pathological conditions of the adjacent structures, the alveolar and maxillary arches, the nose, throat, etc. The orthodontia of the future will consist not so much in regulating teeth as in the stimulating of sufficient development of the alveolar and maxillary arches so that the teeth may erupt into their lines of occlusion in normally sized arches.

On motion Section I then adjourned until a later session.

THURSDAY—Afternoon Session.

Section I was called to order Thursday afternoon July 30th, at 3 o'clock, by the president, Dr. Carr.

The first order of business was the reading of a paper by Dr. C. C. Allen of Kansas City, Mo., entitled "Metallurgy."

The paper here follows:

Metallurgy.

By C. C. ALLEN.

When the rising sun of human progress first gray-streaked the East, he lingered for awhile upon the horizon. Man groped his way in this uncertain light for many centuries, fighting his battles against his adversaries with rough stone implements, little fashioned by his hand, and proving scarcely better than his

naked fingers. During which geological age man has reached his highest purely physical development we do not know. Certain it is that co-existent with adolescent man were powerful and hideous monsters of the earth, air, and water, conducting in awful abandon their riotous war one upon the other. When our imagination pictures to us the condition of the face of the earth at this time, what a paroxysm of horrors it presents! and in all that chaos of destruction persisted that being destined to become the dominating factor of the world through the subjugation of the metals.

While a limited knowledge and use of metals has not insured man's progress, for there are numerous races that have understood the production and the use of iron and of other metals in a limited way, without rising above savagery, yet it is difficult to realize how man could have progressed at all without the friendly aid of these remarkable elements, these blessings of nature. In fact, anthropologists have all agreed that man's true advancement began when he gained knowledge, limited though it was, of the possibilities latent in that plebeian and ignominious stone, the ore of iron.

No true progress can take place other than by thought, and hard manual work and thought are almost incompatible. It is impossible for a man to earn his bread literally in the sweat of his brow, and at the same time carry on within his brain those trains of argument and analysis which are necessary for his uplifting. It was therefore imperative that before man could indulge in meditation and give range to that winged messenger of the mind—imagination—that he have surcease from those laborious and deadening occupations which bound him to the earth. As man depended for his sustenance on what he could wrest from nature with his unaided hands, or at least with only a few rude stones and shells for implements and tools, his work was so arduous and so slow that he had no time for thought other than that bearing directly upon his employment. Not that he was conscious of this deprivation or that he knew of any omission, or desired things to be different. His physical condition prevented his mental growth.

Nothing in our conception of prehistoric man, devoid as he was of every comfort and every convenience, can be beautiful. His first step toward emancipation from this thraldom was the discovery of the art of producing fire. The artificial production of fire is probably the greatest human achievement. It is the turtle upon which the Atlas of his progress stands. Without it metallurgy would never have existed, and all that man would have known of these treasures of the earth would have been gained by his familiarity with a few bits of yellow gold found in the gravel of some fishing stream. When fire was added to his resources, the means of fashioning metals was his. Without fire, the discovery of metals was entirely valueless; with fire he possessed the greatest essential element for the fabrication of these potentially useful substances.

The first metals known to man were those that occur in their metallic state, because of their lack of affinity for oxygen or other elements. These were gold, and silver as associated with gold; then came copper, which is occasionally found in a metallic state. Not long after the discovery of copper, by some means not thoroughly established, man discovered that an alloy could be made of the metal of black stone, or tin, and copper, forming a bronze or brass which was very

much harder than any metal known before, and from which fairly good weapons and tools could be made. The bronze age was comparatively short, but its influence was such as to make the discovery of iron inevitable. Iron is the most democratic of all metals, yet though not of the royal line, has made itself king. Upon it is founded the true culture of man. It has made possible all his intellectual growth. Iron has given him machinery by the aid of which his processes are carried on, and he is enabled by his innumerable mechanical devices to achieve results far greater than were possible with his unaided hands. It has given him his enginery of peace and war for the subjugation of nature and the conquest of his human enemies, and the spoils of his victories have secured him that leisure necessary for the invention and cultivation of the sciences and the fine arts.

All metals, save iron, could be spared without destroying our civilization. The temporary inconveniences could be tolerated and our progress could go on. But take from man the gift of iron and he would lapse into that benighted savagery from which he has sprung. The tribes which learned the use of copper for weapons vanquished the bearers of stone spears, and these in turn gave way to those who had progressed sufficiently to fashion their pikes and colters of harder bronze. Bronze yielded to the more stubborn iron and its alloy, steel, and thus we trace the great transitions of the race. From time to time man by his ingenuity and discoveries has added to his available metals, and while these have been of great value to him and have greatly increased his resources, yet through all the centuries iron has held its undisputed sway. From the little wind furnace of the ancient Hindu worked with valveless bellows to the mighty open hearth of the present day is a far journey, every step of which is marked by romance and tragedy, by disappointments and hopes fulfilled, by wealth gained and wealth lost, by powers established and nations destroyed, by victories won and ambitions crushed—but always by advancement.

Imagine the world today without its railroads, bridges, merchant vessels, firearms, steam engines, manufacturing and mining machinery, dynamos, great buildings and harvesters! and yet how lightly we have touched upon that catalog of great essentials to our civilization, directly dependent upon the service of the metals. Consider the small things of familiar employment which can be made from steel alone—the watch-spring, our multiform tools and cutlery, our dental and surgical instruments. In fact, iron enters so completely into our daily life that no turn can be made, no act performed, no business done, without obeisance to this king. We praise the precious metals gold and silver, we make them the objects of our ambition, we sell for them our priceless time, for them we wage war, rob the weak and despoil the strong, they tempt us to be selfish, envious and brutal. Since the time of the fabled argosies men have gambled with fortune for a golden stake, armies have pillaged the Indies, the lust of gold spurred the murderous Pizzaro to sacrifice the highest civilization in the western world. Treacherously he slew the Incas to gain gold, and everywhere the greed of gold has left its trail of blood. Yet a single ton of iron holds more intrinsic value than all the gold that ever came from Ophir or Peru. Iron has the value

of utility, gold the value of sentiment. "Iron fights out the quarrels of which gold is the cause."

But this beautiful metal, gold, has in a measure redeemed itself in noble service. God in His inscrutable wisdom has scattered this yellow snare to the uttermost ends of the earth. And when men became congested in their original habitations, and it was necessary to distribute them widely over the globe, it was the bait of gold that lured them from their homes into the trackless wilderness of unknown continents. The lure of gold has been the impelling motive of immigrations, adventures, and conquests. When the Phœnician galleys skirted the lonely coasts beyond the pillars of Hercules, when the caravans of Solomon descended into Africa, when the Romans campaigned in Persia, when Cæsar invaded Gaul, when Columbus hazarded the mighty Atlantic, the bait was gold.

Another debt we owe to gold is the science of chemistry. The alchemist with his alembics and his furnace, as he vainly tried to transmute gold from the baser metals, brought forth, not gold, but a science of infinite value and promise and one that bids fair to solve the very riddle of life itself. The alchemist is generally conceived to have been the enthusiastic visionary who sought to transmute baser metals into gold and silver for sordid purposes. Such, however, was not the real object of the ancient follower of this most mystic art. The alchemist was first of all a seeker after knowledge. When the world was young he delved for great truths, and wandered blindly among the principles and laws of both spiritual and material science. But the dim, uncertain light of his chaotic learning afforded him no guiding star. He sought in fields untilled, and sought alone. What wonder that he wandered in the realms of folly seeking such things as the philosopher's stone, the secret of perpetual life, a universal panacea, the alkahest and the transmutation of metals. What wonder that in seeking to explain the natural and little understood phenomena that daily met his eye, he should invent strange and weird cosmogonies. But he worked as a student and not as a charlatan, and not until a comparatively late period of the dark ages did he degenerate into a quack and a fraud, endeavoring to impose upon the credulity of the people for the sake of power and gain.

While gold has been the metal of romance and bitter drama, while it has fired man's ambitions, promoted his enterprises, excited his cupidity and ministered to his vanity, and iron has been the metal of dignity, progress, and accomplishment, yet there are many other metals, and particularly those known to the ancients, which have been his faithful servitors.

Copper was the first metal of any considerable utility which came to man's attention. It gave him his first metal tools and weapons. The occasional occurrence of this metal in the practically pure state, and its characteristic color, could not fail to attract the eyes even of those as little skilled in observation as our primitive ancestors. In man's practical affairs, copper was antedated only by stone implements and utensils. Tin, which is essential with copper for forming bronze, is one of the most beautiful of metals, and seems to have come very near being a noble metal, though it has not completely qualified for that rank. Considering its rarity and the fact that it is so well disguised in its ore, its discovery and subsequent use was very remarkable. Tin has the brilliancy of sil-

ver, is fairly ductile and very malleable, and alloys with copper in practically all proportions. Other metals known to the ancients were silver, lead, and mercury, each of which held a place in their economy, but none had exerted the same influence upon their destiny as iron, copper, and gold.

Thus we see the evolution of the science of metallurgy from seven metals known to the ancients—gold, silver, copper, iron, lead, tin, and mercury. Metallurgy now knows about sixty metals and the table of Mendelejeff indicates that we may expect the discovery of others. Many of these new metals are as yet imperfectly understood and have not revealed themselves to us in their true character, but we have observed enough about them to know that they all possess distinctive value; nearly all of them are available for alloys, and in alloying we are realizing the chief purpose and scope of metallurgical practice. Pure metals are used very rarely if compared with the employment of their alloys, and in this age of high specialization almost every demand is for a metal of characteristic adjustment. Modern metallurgy is enabling us to meet this requirement with increasing accuracy. For instance, we can produce with advantage different grades of steel for rails, frogs, wheels, axles, structural shapes—enough to comply with nearly any specification. At the present time much attention is being directed to the influence of the rarer metals in alloy with the common and better known metals. This is particularly true in relation to the alloy steel, and in recent years the number of steels that have been produced, each designed to serve some special purpose, testifies to the increasing utility of this science. Thus until quite recently vanadium was a laboratory product, but now vanadium steel is a reality, and gives us a new alloy possessing virtues of its own. The same can be said of nickel steel, manganese steel, chrome steel, tungsten steel, and a number of others.

It is altogether likely that in the near future we shall have an alloy of molybdenum and iron, which will be of large use in our industries. From time to time new metals are produced in quantity and individually, and not merely as minor ingredients of other products. Aluminum has become a commercial possibility and a familiar metal within the memory of all of us, and another metal has recently become available which possesses such remarkable qualities that it cannot fail to have a far-reaching effect on our affairs. Reference is made to tantalum, which has been produced in the ingot form by certain German manufacturing chemists. A special characteristic of this metal, and one which gives it distinction, is its hardness. It is harder than any known substance excepting the diamond, and yet if properly manipulated it can be fashioned into most of the multitudinous shapes demanded for tools. Imagine an edged tool, knife, or other instrument which when once sharpened would last a life-time, or a dental student buying a bur which will remain a good instrument all through his active practice. It does no great violence to probability to suppose that this opportunity may soon be realized, though this metal is not at the present time commercially available because of its cost, which is about five dollars per gram. But when we remember the story of aluminum, we are encouraged to believe that tantalum will some day be available in our shops and laboratories. We may look forward to thorium, which is now put to con-

siderable use in thermal piles, pyrometers, etc., and to molybdenum, the ore of which occurs in fairly large and widely distributed quantities.

One of the most remarkable alloys ever produced, and one which was worked out scientifically, is the nickel steel called invar. This alloy, consisting of 36.2 per cent. nickel, comes nearer maintaining absolutely unchanged dimensions than any other substance known. Its expansion under the influence of heat from zero to one degree centigrade is not more than one part in one million. A new field of investigation with which metallurgy is now concerning itself is the influence of non-metallic elements in minute quantities upon alloys. It has been discovered recently that the superiority of Swedish iron over other irons lies in the fact that Swedish iron contains no nitrogen. Heretofore it was supposed that an element as little prone to combination and with as little chemical affinity as nitrogen would have no effect upon iron, but such is not the case. Minute quantities of other gases may, and probably do, affect most of our metallurgical operations, for it is a fact that nearly all, if not quite all, the metals occlude gases. While it is unlikely that we will ever be able to carry on our metallurgical operations in a vacuum, yet if we could, we should probably arrive at some beautiful and valuable results.

There is no way to set bound to knowledge, and this science is evidently only in its beginning, and its possibilities for the good of mankind are as little known as is the science itself. But this old earth has ever yielded to the flattery of man's intelligent attention, and stands ready at his beck to yield her metals to his service, to relieve him of the severity of drudgery and the cloyment of labor. She smiles upon his advances and is willing to accord him dominion. She encourages him in the development of his character, in his intellectual growth, and in the glorification of his soul, that in the end he may justify the book wherein it is written, "In the image of God created He him."

Discussion.

Dr. C. W. Rodgers, Dorchester, Mass. The essay presented by Dr. Allen has been most interesting and instructive. In discussing this paper I wish to dwell for a few moments on the maxims expressed by Dr. Allen that "No true progress can take place other than by thought," and "Hard manual labor and thought are almost incompatible."

In discussing this subject I need not explain that I take no exception to the well-known fact that a derangement of the bodily functions induces an injury to the mental powers, because of the close union of mind and body.

There seems to be a tendency in educational institutions of this country to instil into the minds of the young men the notion that large physical development and physical energy are essential to the loftiest intellectual achievements. At some of the colleges and universities athletics are maintained and fostered which take up a considerable portion of the students' time, for the express purpose, it would seem, of educating the muscles.

It is a popular fancy that if intellectual eminence and long life is to be attained by a student he must needs hie to a gymnasium, there to sacrifice time and gain the strength, agility, and mag-

nitude of the physical system which are essential to those whose employment for life is to be physical labor.

This modern doctrine is opposed to both nature and experience, and reason would teach us that if God has intended a division of labor, and has so constituted the human system that it may be trained to different pursuits, he who is to be professionally engaged for life in an intellectual calling must train himself to the least physical necessities and to the greatest and most continued intellectual effort practicable, leaving the more special cultivation of sinews and muscles to those who have more use for them.

The ancient Greeks and Romans excelled in physical culture, witnesses to which fact are their wonderful models of the human frame, handed down to us by the chisel. Mighty were they in all feats of physical prowess—boxers, wrestlers, racers, leapers; but which of these possessed intellectual minds? Nearly the whole galaxy of Greek and Roman scholars who shed the everlasting glory of intellect upon their nations were unknown to perform feats of prowess, and most of them are recorded to have been men of rather slender physical development, or of some bodily infirmity. Modern biography tells the same story of the long list of German, French, British, and American scholars.

The calling of the laborer is as honorable, useful, and important as that of the man devoting his life to a liberal profession, but the two callings do not require the same kind of training, either physically or intellectually.

The physical system of the student is not necessarily to be kept in the same state as that of the laborer, any more than the intellectual system of the laborer is to be kept in the same state as that of the student.

The thought which I have tried to develop from this part of Dr. Allen's paper is that physical perfection is not essential to mental eminence, and that if half of the time and expense devoted to the erection of stadiums, gymnasiums, and to the fostering of football and allied sports were given by our institutions of learning to the support of experienced, scientific lecturers, such as Horace Fletcher and Professor Wiley, to instruct their students how to live, we would have more scholarship and less dyspepsia.

I have tried to develop this part of Dr. Allen's paper because of the lessons which may be conveyed to the young men entering our profession. Dentistry has made rapid progress during the past two generations, and has gained the respect and the attention of the civilized world. This has been accomplished largely through the skill and the manipulative ability of its members. If dentistry is to continue in its development and gain for itself a high place among the learned professions, more and more of the younger men must do research work and delve deeper into the mysteries of the human tissues.

Not upon the past but upon the future must we look as upon the golden age of dentistry, when our calling will take its high place among the learned professions of the earth. This can be obtained only through intellectual achievements, and intellectuality must be fostered by persistent training not of the muscles but of the intellect.

Dr. Allen has presented a most fascinating picture of the development of metallurgy and its effects upon the history of the human race. He has pictured

for us the evolution of metallurgy into alchemy and of alchemy into chemistry.

The mythological history of alchemy is very interesting. Zosimus the Panopolite, declares that the art of making gold and silver is not a human invention but was communicated to mankind by the angels or demons. The story is to the effect that these angels fell in love with women, and were induced by their charms to abandon heaven altogether, and to take up their abode upon earth. Among other information which these spiritual beings communicated to their paramours was the sublime art of alchemy, or the fabrication of gold and silver.

Europe was first indebted to the Arabians for the introduction of a knowledge of alchemy. It was confined by them principally to the extraction of metals from the earth and to the preparation of medicines. The Saracen conquerors brought with them their physicians, who cultivated this science and introduced a knowledge of it into Spain.

It appears, however, that the Egyptians were not ignorant of alchemy, but, unfortunately, most of their writings were lost to the world by the burning of the Alexandrian library. It is evident from the relics found with the mummies that they were familiar with the manufacture of variously colored glass and frit. Beads have been found colored deep blue by oxid of cobalt, and fine green by oxid of copper.

The rich permanent color of their pigments used in painting sarcophagi and in inscribing hieroglyphic mementoes shows an acquaintance with the art of preparing mineral colors fully equal to those made in modern times. The magic wrought by the Egyptians in their mysteries was in a great measure dependent upon the knowledge of chemical preparations.

Alchemy, introduced into Spain, was soon spread over the continents of Europe and Asia, and became the object of great curiosity. The celebrated academy of Bagdad was founded by the liberality of a powerful Arabian, Caliph Almansoor, about the middle of the eighth century, and attracted students from every quarter of the world.

During the thirteenth century the academy, which had fallen into decay, was re-established by Caliph Mostanser, and every department of human learning was encouraged. The most distinguished writers among the Arabians were Geber and Avicenna, whose works have been preserved and translated into Latin.

As Dr. Allen has stated, the alchemist up to that time had been a true seeker after knowledge, delving into the profound mysteries of the Almighty.

During this age alchemy became degraded by its abuse and its name a reproach to those professing it. Impositions were practiced to a most incredible extent. There were still, however, honest men deeply engaged in the science under the most cruel persecution, and some of these, while honestly engaged in the search for the elixir of life and the philosopher's stone, discovered substances of far greater value to humanity than either of those two would have been, namely, sulfuric, nitric, and hydrochloric acids.

Gunpowder, Prussian blue, porcelain, and many of the salts and metals, were discovered by these men, and their researches served to keep the science alive, and the foundation was laid upon which the splendid structure, modern chemistry, has been built.

Later on, in 1526, Paracelsus, a prince

of quacks, by his wild enthusiasm aided chemistry by making it an indispensable study to all medical practitioners.

It is of course to comparatively modern times that we must look for the most brilliant discoveries, and the world is indebted to Black, Cavendish, and Priestley for their researches into pneumatic chemistry; also Bergmann and Scheele of Sweden brought the art of working metallic ores to a high state of perfection.

Dalton, Davy, and a long list of other noble workers might be mentioned, but this is unnecessary in the discussion of this paper.

Chemistry is one of the most important branches of dental education, and the future of our profession depends upon the extent to which it is studied by the practitioner.

On the portico of the academy of ancient Athens was this inscription: "Let no one enter here who does not understand geometry." The Greeks so valued this science that one not acquainted with its principles was forbidden to enter the temple consecrated to learning and to refined taste.

Geometry was valued not only for its immediate practical utility, such as the measurement of land, calculation of distances, construction of dwellings, etc., but because it taught the Greeks symmetry in the proportions of the temples whose unrivaled beauty has ever since served as models in architecture.

Geometry also ennobles the human mind, and it taught the Greeks to reason and to investigate the laws of nature, into which so many of their philosophers were delving.

Chemistry, likewise, considered in its application to the development of the intellect, is of immense value, as it teaches the mind to analyze the phenomena on which it reasons.

Chemistry has so much value to the dental profession from every point of view that it were well to have the word chemistry inscribed on the porticos of every dental school in the country, and to have the principle fully enforced, "Let no one enter here who does not understand chemistry."

Dr. C. J. Grieves, Baltimore, Md. This paper, to my mind, takes a profoundly scientific turn; in fact, I want to congratulate the National Association on the tendency of the papers at this session. We had a most interesting and fascinating talk from Dr. Bates on histology and embryology, and during that talk, as through the reading of Dr. Allen's paper, the thought came to me that we must do these things, that science should be appreciated for itself, that for our own good we should worship science, with the great and grand broadening effect which such worship would be bound to produce. So I think it is very fitting that our profession should undertake these concrete studies and investigations. I wish to congratulate Dr. Allen for introducing such a subject, a subject that deals with anthropology, with the beginning of things, and with the reflex of matter acting on man toward a better civilization.

In his address of welcome, Governor Guild very happily said that Massachusetts was "a state of mind," and I hope that our profession will come to that "state of mind" where we can take up these scientific studies for their value alone as scientific studies. No matter when man has attacked mother earth, even as early in life's history as prehistoric man, the result has been a mental

development, until now the frontal lobes are so wonderfully developed that we have a partial degeneration of the lower part of the face, the maxilla and mandible. So I differ somewhat with Dr. Rodgers' statement, for we need a very careful physical development along with the mental development. Applied to our profession, it can be safely said that if we had the masticatory apparatus of primitive man, we would not be in session here today.

If I might draw a simile, it would be that dentistry has developed as a true science very much along the line of the development of man with metallurgy. that is, the pioneers delved and worked with crude materials, ground and fused stone to make porcelain, and hammered gold that they might know it; so through their physical labor they had very little time in the early days for investigation. Gradually, as materials and methods have improved, the dentist has come to have more leisure for recreation and research. It might be opportune to make the prophesy that the newer methods which are coming in will produce even greater results; there will be less nerve-racking strenuousness, particularly at the chair, and we will be all the better in the evening for our study or general research. The newer methods may come to bear the same relation to the development of dentistry that the development of metallurgy produced on the civilizations—in this respect, that when races have gotten to the point of leisure, they begin to degenerate, and I would deplore any very far variation from the method of operative teaching now employed. I refer to the "easy going methods," the introduction of plastics or inlays that would affect the dental education to the extent of not training the man along the good old lines of work, gold work at the chair.

I have one other thought in this connection, which is: By the development of metallurgy our own profession may be further benefited by the introduction of new metals, and, viz, by analysis of those we now use and often do not know; by analysis of the saliva we may know the mouth environment; and we will not in the future as in the past, in orthodontia, bridge work, or inlays introduce into the oral cavity, the environment of which we know so little, various metals that may not be suited to that environment.

Dr. C. R. Turner, Philadelphia, Pa. The gentlemen who have preceded me in discussing this most interesting paper have delighted you with a discussion of its more scientific phase. I am going to depart somewhat from their views on the subject in calling your attention to the beautiful poetry of Dr. Allen's essay. In taking that ground I feel that in attempting to discuss this subject I might just as well essay to discuss the splendid goodfellowship of Omar Khayam, or the profound philosophy of Browning, or the drama of Ibsen, or anything else that represents the best of its kind, and about which I know so little. Notwithstanding my shortcomings along this line, I can at least tell you of my admiration for the essay from the standpoint of one who has had to teach this subject. My experience has not been, I think, an unusual one; that is, I believe that generally the interest which the dental students take in chemistry and metallurgy is less active than their interest in almost any other branch, although this branch is fundamental to their preparation for dentistry.

Dr. Allen's analogy between the effect of the development of the race and the

discoveries in the general study of metallurgy and their effect on dentistry is interesting. It is undoubtedly true that the increase in the knowledge of these useful elements has advanced our development as dentists almost as profoundly as it has affected the development of the human race. While the development of humanity up to Bessemer's discovery of the process of making steel by commercially economic methods was great, it is nothing if compared with the spreading of civilization since steel has become a commercially economic possibility, and if we were to take from history or from the present status of the world the influence which steel has had as a civilizing factor, I shudder to think how far back in civilization we should find ourselves.

The influence of the future of metallurgy on dentistry, as well as on other departments of human learning, will no doubt be also profound. Since the Curies have discovered many new properties of radium and of the radio-active bodies, we are beginning to wonder if the dreams of the alchemists of old, who so long and so earnestly studied the question of the transmutation of elements, may not have their realization in these researches. And if the science of metallurgy and chemistry is to reveal in the future such possibilities as this particular discovery is evidently going to do, I wonder how the dental student of the future will be able to learn metallurgy at all.

Mr. Chairman, I compliment the section and Dr. Allen on this beautiful paper. I wish that the general standard of the essays presented to the sections at all the meetings of the National Association might be of such a standard. I do not mean to say that those papers that we have heard here have not been so, but if we are successful in securing such beautiful and interesting papers, we shall always be assured of a large attendance at our meetings.

Dr. Allen (closing the discussion). Mr. Chairman, I have nothing further to say, except to thank the section for the kind reception given to my paper.

There being no further business, Section I adjourned *sine die*.

SECTION II:

Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

Chairman—A. R. STARR, New York, N. Y.
Secretary—V. S. JONES, Bethlehem, Pa.

FIRST DAY—Tuesday, July 28th.

THE first meeting of Section II was called to order on Tuesday evening, July 28th, at 8.30 o'clock, by the chairman, Dr. A. R. Starr, New York, N. Y.

The first order of business was the reading of a paper by Dr. JOSEPH HEAD, Philadelphia, Pa., entitled "A Tartar Solvent Especially Useful in Pyorrhea Work," as follows:

A Tartar Solvent Especially Useful in Pyorrhea Work.

By JOSEPH HEAD.

DURING the last four years, while testing the decalcifying power of various acids on natural tooth enamel and cements, I dropped an extracted split tooth covered with black tartar into commercial hydrofluoric acid. On the following day I examined the tooth and found it clean and white, with neither enamel nor cementum in any way harmed, except that the remnants of pericementum on the root had disappeared, and the surface of the dentin was decalcified. Repeated experiments with teeth and hydrofluoric acid confirmed these tests. Then, with the permission of a patient, I tried a very little acid around a loose tooth. It removed the tartar, but its action on the surrounding membrane, as would be expected, was intense and very irritating; and yet, in spite of these drawbacks, satisfactory healing of the pocket occurred and the tooth became distinctly firmer.

I then turned my attention to the hydrogen salts of hydrofluoric acid. The sodium, potassium, and ammonium salts

seemed to offer the best fields for investigation, and after a series of experiments, suffice it to say that, of these three, a solution of hydrogen fluorid of ammonium seems to give us exactly what we require. It will dissolve tartar and not dissolve enamel, cementum, or pericementum. It is a colorless and acrid-tasting fluid that can be dried upon the skin without cauterizing. In some instances it causes a slight reddening and tingling, but nothing more severe. It can be injected into a pyorrhea pocket through the root-canal of a tooth that leads to a fistula or pyorrhea pocket, with excellent results and no sloughing. But if this acid salt is allowed to soak into a dried gum in any quantity it makes a burn as bad as that of carbolic acid. I mention this fact in order that those who use it can take due precaution. The pocket or pockets around the teeth to be treated should be dried, and the gum protected with napkins. The pockets can then be filled with the salt solution, and the rest of the gum in the neighborhood carefully wiped with a piece of cotton. At the end of two or three minutes there will be a slight whitening of the gum around the pocket, with some irritation, when the patient should rinse his mouth with water. It softens lumps of tartar so that they can readily be removed by the scalers, and it dissolves any microscopic bits that are overlooked by the instrument. It also seems to stimulate the gum to healthy action, so that pockets heal up with granulations that adhere to the root, and the loose tooth becomes firm and strong.

The method of manufacture is as follows: Hydrofluoric acid is neutralized by ammonium carbonate until there is complete neutralization of the acid. This solution is then filtered. This liquor is ammonium fluorid and has but little power of chemical action. This ammonium fluorid solution is then evaporated in a leaden dish to one-half of its bulk, filled up to its original bulk with hydrofluoric acid, and evaporated to one-half of its bulk again. This gives us the hydrogen ammonium fluorid of which this paper speaks. It evaporates readily, distributing its crystals on all adjacent objects, and is extremely difficult to restrain except in a wax bottle. The dried crystals wetted with water do not seem as effective as the original liquor from which water has been excluded.

This solution can be applied either by a pair of tweezers used as a drop-carrier or with a rubber syringe with a platinum point.

If the hydrogen ammonium fluorid is not properly made, and unrestrained hydrofluoric acid is left in this solution, its action will be too severe and may do harm.

The fact that hydrofluoric acid and its hydrogen salts will dissolve tartar and not external tooth-structure is important, and further investigation may give us a tooth-wash and tooth-powder that will really keep the teeth, where there is no porcelain, free from tartar without the constant assistance of the scalers in the hands of the dentist. The fact that hydrofluoric acid will dissolve tartar and not dissolve enamel must prove a puzzle to the most enthusiastic chemical theorist. For notwithstanding the fact that enamel contains a small per cent. of calcium fluorid, both enamel and tartar are composed largely of the same substances—carbonate and phosphate of calcium. It is equally astonishing to note that a watery solution of carbonic acid or citric acid will cut enamel, although hydrofluoric acid is held to be a giant

by comparison. This is as puzzling as the fact that saliva, irrespective of whether it is acid or alkaline, sometimes protects the enamel from decalcification and sometimes does not.

These three chemical anomalies are among thousands of similar incongruities that are constantly occurring in the human economy. They give rise to tantalizing and inspiring problems, but at the same time they should give pause to some of our modern chemical theorists, who would solve the complicated reactions of faulty metabolism by the simple formulas of inorganic chemistry.

I have merely given the results of experiments that have extended over three years, and these results I have withheld for a year in order that I might give this hydrogen ammonium fluorid a thorough therapeutic trial. I am so sure of its value that I want to have the whole dental profession share the knowledge of it with me.

Discussion.

Dr. W. B. Dunning, New York, N. Y. It is difficult to discuss a new proposition in any more than a speculative way, and when that proposition concerns a vital question in chemistry, the difficulty is still greater. A mathematician may reach, through pure deduction, an inevitable conclusion, but the student of organic chemistry works in a field in which the sources of error are not fully known, and where proof can only be arrived at through experiment. He must be prepared to find that two plus two may mean six or six hundred, or nothing, and Dr. Head in concluding his paper very properly impresses that point upon us.

Dr. Head, therefore, certainly has the advantage over most of us when he states that by careful experiment he has found that hydrogen ammonium fluorid will dissolve tartar, which is composed chiefly of calcium phosphate and carbonate, but will not affect the various structures of the teeth, all of which are composed of practically the same substances. There is no room for theoretical argument, if the complete proof of this paradox has been reached by practical means; but as the most painstaking work may be subject to technical error, it would be gratifying to know more specifically the various checks used by the essayist in excluding such possibility.

In the opening paragraph of his paper, Dr. Head makes a statement which in view of what follows leaves one somewhat in doubt as to its exact meaning. In speaking of his first experiment, he says that having placed a tooth covered with tartar in commercial hydrofluoric acid for a day, he "found it clean and white with neither enamel nor cementum in any way harmed, except that the remnants of the peridental membrane on the root had disappeared and the surface of the dentin was decalcified." I should like to ask if by this he means that the enamel and cementum were not affected, but that some exposed surface of dentin suffered from the effect of the acid? This is a practical question, for a certain amount of exposed dentin may usually be found in the mouths of persons over thirty years of age, as the result of abrasion, and if any effect was noted on the surface of the dentin in the experiment mentioned, the question naturally arises whether, under prolonged treatment, a similar disintegration of other closely allied structures might not occur. I take it that the action of the hydrogen ammonium fluorid is similar to that of hydrofluoric acid in a lesser

degree. Does the essayist mean that tooth-structures are but slightly attacked by the compound he recommends, so that the skilful operator may get rid of the tartar but prevent further action by deft manipulation? Or has he determined that prolonged applications have no effect upon the tooth? The escharotic action on surrounding soft tissues is of secondary importance, for that is readily seen and controlled by the operator, but an insidious action on any part of the tooth would be a serious drawback.

It would seem as though steel instruments must be badly affected by the liquid, either by direct contact or by the escape of vapor in the cabinet. Will Dr. Head speak more especially of the technique in handling this awkward compound which will attack almost anything but a wax bottle?

If all reasonable doubts have been removed, then we may congratulate ourselves upon having received a most valuable help in our most difficult work, and our gratitude to Dr. Head for his labors cannot well be expressed in words. This preparation should be put up by a reliable manufacturer, and should be examined and tried with all due precaution, so that whatever benefit may be derived from its use shall be widely known as soon as possible, for the highest instrumental skill in the removal of serumal calculus is inadequate in much of our pyorrhea work.

As to mixing this agent in a dentifrice, I think Dr. Head's qualification against its use in mouths containing porcelain fillings and crowns is a sufficient objection to make such a preparation impracticable for general use. It would seem that its greatest value will be found to consist in removing tartar scales which are beyond the easy reach of our instruments.

Dr. A. H. Merritt, New York, N. Y. It is probable that there is no problem in the whole realm of dental practice which has so long baffled every effort at solution, nor one which is receiving more attention than the problem of pyorrhea alveolaris. But notwithstanding all the investigations which have been made along this line, and with the almost limitless amount of literature on the subject, there still exists a great diversity of opinion regarding its etiology and treatment. Men are everywhere—in the present as well as in the past—searching for the hidden causes of this most destructive disease.

Perhaps no better illustration of this could be found than that presented in the circular letter recently sent out by the Dental Society of the State of Louisiana. But whatever theory one may hold concerning its etiology and treatment, there is one feature in its treatment about which all are agreed, *i.e.* the necessity for the complete removal in every instance of all calcareous deposits upon the roots of the affected teeth, without which no other form of treatment will of itself avail anything.

If we consider the difficulty of accomplishing this by instrumentation in any case, the physical impossibility of complete removal in not a few instances, the necessity not only of complete removal, but of leaving the roots from which such concretions have been removed smooth and polished, the tediousness and the pain which to a greater or less extent are always attendant upon such treatment—it is not until we have considered all this that we are prepared to appreciate something of the value of the treatment outlined by Dr. Head. I

venture to say that because of its almost universal applicability, it will prove to be the greatest forward step which has ever been taken in the treatment of pyorrhea alveolaris. While I am not one of those who believe that the sole requisite for the successful treatment of this pathological condition is the thorough removal of the deposits from the roots of the affected teeth, I nevertheless believe that there is no one factor more important in its treatment, nor one which, independent of any other, will be attended with such universally satisfactory results.

I regret that I am not able to throw some light on the chemical anomaly which is here presented. It only lends additional emphasis to the fact that in biology it is never wise to leave Nature out of consideration, and that in the field of physiological chemistry she refuses to be interpreted in the simple formulæ of inorganic chemistry.

The possibility of a dentifrice which by judicious use will not only keep the mouth clean in the ordinary sense of that word, but will coincidently keep the teeth free from deposits of tartar, is a most attractive one—one which, if realized, will be a great advance toward that dental millenium—preventive dentistry.

The value of Dr. Head's discovery cannot be overestimated, and with it he has only added to the obligation which the dental profession owes to him. With it he has conferred a great boon upon suffering humanity, and anyone aiding in its emancipation from the ravages of this destructive disease must be regarded as a public benefactor.

For the sake of clearness I wish Dr. Head would, in closing the discussion, explain a little more of the detail of his technique in the use of this solvent; whether he depends upon it solely for the removal of the deposits or whether he uses it in connection with scalers; whether it acts with equal facility in all cases, or whether he finds it necessary to make several applications in some instances.

Dr. Edward C. Kirk, Philadelphia, Pa. The subject, I need scarcely say, is new to me, as it doubtless is to all of us, at least as far as the application of this composition is concerned. I use the term composition advisedly, because I am skeptical as to its being a chemical compound at all. I do not understand by what method of reasoning it is possible to make such a compound as the essayist designates as hydrogen ammonium fluorid. At least according to the teachings of chemistry that I have had, I do not think that such a compound is chemically possible.

Dr. Head. How about hydrogen ammonium bifluorid?

Dr. Kirk. That also I do not think is possible.

Dr. Head. The text-books speak of it, anyhow.

Dr. Kirk. I speak only from memory, but as I now remember it hydrofluoric acid is what is called a monobasic acid, and the preparation, as I understand it from the method of making it, as given by the essayist, is a mixture of ammonium fluorid with an additional quantity of hydrofluoric acid. This mixture has been known in the arts for many years, and has been used in the glass-etching industry to produce that particular physical result which Dr. Head has produced in his experiment on the glass tumbler, that is, to give to glass a frosted appearance. Where pure hydrofluoric acid is used in a liquid form for etching on glass, it produces a vitreous

lustrous surface; it dissolves the glass, but the etched surface does not have the frosted opaque appearance. In order to obtain the frosted surface it has been the custom to add a certain amount of ammonia, which has been found to produce that result, and, as I understand it, that is practically the preparation that Dr. Head has brought before us. But what is new and extremely interesting is the point which he makes with reference to what we may call the selective affinity of this mixture for tartar as apart from tooth-structure. In view of Dr. Head's experiments and observations it seems that this is perfectly possible and highly probable, with a reasonable doubt in my mind that at least makes me want to test the matter for myself. I am somewhat of a doubting Thomas, and I think it just as well for several people to test a suggestion of this sort as one. But I do raise a question as to the propriety of using in connection with the soft tissues of the mouth a preparation which is so closely allied to hydrofluoric acid, and especially of using it indiscriminately. It should in my judgment be used with extreme care, because we all know the very disagreeable results that follow the application of free hydrofluoric acid to soft tissues, because of its peculiar and intensely escharotic effect. I have been interested in the reports from the dental profession coming in from day to day of disastrous consequences that happen from the careless use of hydrofluoric acid since it has come into use so generally with the growth of our interest in porcelain work. It is known among those workers in glass and enamels who use hydrofluoric acid that the burns produced are extremely painful, producing a hardening and destructive effect upon the cuticle and subjacent tissues, often causing great deformity of the finger-ends when the acid gets under the nails of glass etchers. From the theoretical point of view I do want to raise a note of warning, or at least a word of caution, as to the general use of this mixture, which is so closely allied to hydrofluoric acid, before several observers have tested the matter out thoroughly. I think we are all indebted to Dr. Head for the report of his suggestive experiments tending to show that this material, this mixture of ammonium fluorid and hydrofluoric acid, whatever it may be chemically, has a selective action which enables it to dissolve tartar without having a corrosive effect upon the enamel or dentin of the tooth. I agree with the last speaker that it does seem to be not only a chemical but a physical anomaly that we can use a substance, a solvent, which has the power to dissolve porcelain and is so closely allied to hydrofluoric acid and yet is without danger to the soft tissues.

Dr. W. M. Dailey, New York, N. Y. As the gentlemen who have preceded me have gone into the subject of the chemistry connected with the new compound that Dr. Head has brought before the profession, it seems hardly necessary for me to take up that side of the subject. If Dr. Head has discovered a new chemical compound by which we shall be able to dissolve the calcific deposits on teeth, I feel that we shall be highly benefited by his discovery; but the fact remains that, following certain experiments with hydrofluoric acid which Dr. Head has brought before us in his paper, I found that a fifty per cent. solution in which teeth were immersed for thirty-six hours, and also a twenty-five per cent. solution applied for the same time, produced no destruction of the cal-

cific deposits on the roots, but there was a decalcification of the enamel. I therefore present these tests, and leave the subject for your consideration.

Dr. HEAD (closing the discussion). I shall take up the remarks in their order, and if I leave any question unanswered I hope that I shall be reminded of it. I do not pretend to be able to answer all of them, but I think that I can make some of the questions that have been brought out tonight a little clearer.

Concerning the decalcification of the dentin that Dr. Dunning spoke of, I found that the tissue was decalcified because the tooth had been split and dropped into the solution. When I used teeth that were ordinarily sound, I found that the enamel and the cementum were not hurt at all. Incidentally, I cannot understand what Dr. Dailey used—or else he must have had some teeth whose structure was different from that of the teeth with which I experimented. I speak only on the basis of about one hundred or one hundred and fifty experiments, in which the teeth were immersed in the solution, allowed to dry, and kept for a week or two weeks. I cannot, of course, object to Dr. Dailey's experiments, because they speak for themselves. I only have to say that I would be glad to have you all try this compound, and if it be true that it will do what I have stated, you will find it out, and if it will not do this, you will find it out also.

Dr. Dunning also asked how this preparation is used. You can apply it with steel instruments, and it hardly seems to affect steel more than would water. The method of using it is very simple and I have waited for over a year before I presented this to the profession. I have always believed that the only means of curing pyorrhea is the absolute removal of the tartar and a subsequent packing of the pocket with quinin or with anything else that will keep it aseptic. It has been my experience that in these conditions the quinin acts as a stimulant on the gum tissue and causes it to re-adhere to the tooth. Now, however, I do this: Where the pocket has been formed and there is tartar in the pocket, I apply hydrogen ammonium fluorid under the gum, and after about two minutes I tell the patient to wash his mouth. When he comes the following day the tartar is so soft that it can be readily removed. I do not understand why such a small quantity in the mouth should have such a thorough effect—there is a great deal about it that I do not understand. One thing I do know, that it will dissolve these microscopic bits of tartar, and cause the gums to re-adhere by healthy stimulation.

I recall one case of particular interest that I should like to cite: A patient came with a loose upper central incisor, and on examination of the pocket with an instrument there appeared to be a lump of tartar at the tip of the root. Heretofore I have considered such cases practically hopeless, but as the patient was anxious for me to make an attempt to save the tooth, I first cleaned out the root-canal, and finding a clear passage through the canal to the pocket, I filled the root-canal full of the fluid and taking a piece of rubber forced it through the canal into the pocket. I did that about twice a week. There was considerable irritation, of course, but not so much that the patient could not readily bear it. The condition of the tooth seemed to improve, and the patient was encouraged to such an extent that against my own better judgment I was persuaded

to continue this treatment, until this summer, about a month ago, when the patient was about to leave me, I had reason to suspect that there might be trouble at the tip of the root. I therefore had an X-ray picture made, and found under this central incisor an impacted canine tooth that was doing its best to push its way through. I do not know whether the tooth will finally be saved, but I do know that the patient and all her family are very much pleased with the progress the tooth has made toward recovery, and instead of my hopelessness I am beginning to feel that the tooth will be saved. I have in many instances injected this compound into pockets, and have used it for a long time, and I have had one or two burns where it was allowed to get on the gum tissue and to remain there until it dried. The gums should always be wiped clean of any excess. But by following the directions described in the paper I have not had any trouble, and I can only say that if any of you will inject this solution around the tooth, and keep it there for two minutes, having first protected the gum margins, you will have no trouble from burns if the patient rinses his mouth inside of two minutes. I do not for a moment think that this medicine can be used in a haphazard way in the mouth, but I would strongly recommend its proper use.

Dr. DUNNING. With regard to the effect of this solution on dentin, did I understand you to say that the dentin was somewhat affected?

Dr. HEAD. There was no question about its not having an effect upon dentin, but this was in the case of the tooth that had been split and in which the dentin was exposed. It seemed to have somewhat the same effect on the dentin that sulfuric acid would have. However, when the dentin is protected this preparation has the advantage of not affecting the enamel or cementum at all.

With regard to that very interesting question raised by Dr. Merritt concerning a mouth-wash, I perfectly appreciate that in the present state of our art it will not be very valuable, but I cannot help looking forward to the time when with proper attention to the care of children's teeth, the teeth will not be full of porcelain, and there will be no artificial dentures or bridges in the mouth, but tartar, even then, I think, will be with us. I am looking forward to that time, hoping that we may then have an effective method of combating our one remaining enemy.

Now, I take great pleasure in speaking of Dr. Kirk's objections. When Dr. Kirk speaks on the subject of chemistry we take off our hats, but I cannot in this instance understand Dr. Kirk's statement that hydrofluoric acid is a monobasic acid. I have looked up hydrofluoric acid very carefully, and while I do not know the complete chemistry of it, I think if Dr. Kirk will look up Remsen he will find that under the head of hydrofluoric acid Remsen speaks of two great classifications of the salts of hydrofluoric acid—the hydrogen and the basic salts—and as further proof I have at my office the bifluorid of potassium and the bifluorid of sodium made by Baeder, Adamson & Co. In fact I have used the bifluorid of potassium in experiments along this same line, and it has somewhat the same effect as the solution I speak of, except that it is not so effective. And so I cannot understand Dr. Kirk's statement with regard to these salts, because for the first time in my experience I find Dr. Kirk differing with Remsen.

Concerning the dangers of hydrofluoric acid, nobody knows them any better than do I—an old porcelain worker. I dropped a little on my finger the other day, which I felt for a week; the spot is still on the finger-nail. I should not advise the use of hydrofluoric acid in the mouth—at least I would not allow it to be used in mine. I appreciate the great danger connected with the use of this solution if it contains uncontrolled hydrofluoric acid, but when this solution of ammonium fluorid is used properly I think it is harmless, and I do not think that the burns from it are any more harmful than the burns from carbolic acid, and burns will never occur if the gum is wiped free from the excess. As stated before, I have injected it into blind abscesses and have used it in other ways, and I have great confidence in it, but why it should be harmless in the tissues of pyorrhea pockets and on the outside burn the mucous membrane I do not understand; as I said, there are a great many things about it that I do not understand, but in spite of Dr. Dailey's experiments I am still convinced that it will dissolve tartar and not dissolve enamel or cementum, which can be easily proved by experiment. I do not know what it was that Dr. Dailey used, whether it was sulfuric acid or what, but I am convinced from my experiments that Dr. Dailey's solutions were impure.

A MEMBER. Do you find that free hydrofluoric acid is liberated after the preparation is kept for a time?

Dr. HEAD. I have not found it so. I have been using it for a year, and with the one or two exceptions of burns that I have spoken of, I have had nothing but good results.

The next order of business was the reading of a paper by Dr. W. L. FICKES, Pittsburg, Pa., entitled, "A Few Principles in Relation to Colors, and Their Application to Porcelain Inlay Work," as follows:

A Few Principles in Relation to Colors, and Their Application to Porcelain Inlay Work.

By W. L. FICKES.

A PORCELAIN operator will meet with many difficulties in his attempts to match the teeth if he be ignorant of the principles of light and color. A knowledge of these principles and their application to the arts should enable him to accomplish very pleasing results, which could not be attained without such knowledge.

The optical effect of the color of a porcelain inlay is dependent upon innumerable conditions and influences, some of which are uncontrollable, while others can be so modified as to produce, approximately, the desired effect. Many of the possible modifications are so slight that they would only confuse the operator were he to attempt to consider them. Those influences which cause barely perceptible modifications in the more intense colors need not be considered in relation to the weakened hues and light tints

of color which are used in matching the teeth. There are a number of influences which modify colors, however, which must necessarily be considered. These tend to confuse the beginner, but they are soon made to serve the purposes of the colorist.

IMPORTANCE OF SKILL IN THE PERCEPTION OF GRADATIONS OF HUES AND TONES OF COLOR.

The ability to imitate the various hues and tones of color of a tooth depends as much upon our susceptibility to the various gradations of color as upon our skill in the manipulation of materials.

Color is distinguished as possessing three attributes; namely, purity, hue, and luminosity. The standard colors are those found in the normal spectrum. The purity of the color of a natural object is the proportion of white light to that of colored light emitted from it. The hue of a color depends upon the degree of refrangibility, or the wave-length of light. The luminosity of a color relates to its brightness, or the amount of light emitted. A color is at its greatest intensity, or is saturated, when it is at its greatest purity and of considerable luminosity. An excess of reflected light, however, would have a tendency to detract from the intensity of hue.

It has been found that the eye is so sensitive to changes of wave-length, or hue, that more than a thousand hues of the normal spectrum are distinguishable. Rood estimates that by one hundred slight variations in luminosity, and by further multiplying the variations of hue twenty times by additions of white light, the number of hues and the variations in their tones distinguishable to the eye is two millions, without taking into account all the possible changes which might be perceptible. If the trained eye can note these numerous gradations of color, we can readily see the possibility of improvement in the susceptibility of our own eyes, since the ordinary person can distinguish only a few of the more intense colors and a very limited number of changes in their tones.

It is only the delicate tints of color that we find in teeth, and in order to imitate them it is first necessary to be able to distinguish them. The slightest variation in hue or tone can be noted by the expert operator, and upon this depends, to a considerable extent, his ability to overcome color problems. It is therefore imperative for the inlay worker to observe and study colors, and the various influences which modify their purity, hue, and luminosity.

PIGMENTS AND THEIR RELATION TO PORCELAIN.

The color of a natural body is caused by the light which is projected from its surface to the eye, and is not contained within the body itself. It is the portion of light which the body rejects, and not that which it absorbs, which gives it color. Pigments are powdered materials used to produce colors, and they are mostly mineral substances. Each discrete particle of a pigment is, usually, a minute transparent body. These particles cause color by selective absorption. Each particle of a pigment may be transparent, and yet, when many of them are commingled, they may appear either opaque, subtranslucent, translucent, or transparent. The color of porcelain is principally due to its chemical and physical constitution, and to the presence of pigments governed

by the various phenomena of absorption, refraction, reflection, diffusion, etc., of light.

It has been found that mineral pigments are the most permanent, and of those used for the coloring of porcelain the most refractory are usually less liable to change their color in the mouth. Those made from mineral substances which are easily oxidized, or which are changed by the action of light, moisture, air, acids, and other causes, have generally a lower fusing-point than those of the more permanent class. The variety of pigments used in coloring the so-called low-fusing porcelains is greater than that required for the high-fusing ones, as many pigments cannot stand the greater heat. These low-fusing pigments are a disadvantage, because they are susceptible to changes in the mouth. All the hues and tones of color required for matching the teeth are included in the higher-fusing compounds. An infinite variety can be produced by combinations of a few colors.

APPLICATION OF COLORED PORCELAINS IN THE CONSTRUCTION OF AN INLAY, TO IMITATE THE COLORS OF A NATURAL TOOTH.

All the pigments used to color the high-fusing porcelain bodies will mix, and innumerable combinations may be formed. The porcelain operator may mix all the colors of the high-fusing bodies with as much freedom as he can mix those of oil or water. The colors do not change materially during the baking process, except that they are developed to their full intensity. Mixtures of refractory porcelain colors will, on firing, undergo approximately the same modifications of hue and tone as are produced by the mixture of oil or water colors of equal intensity of hue and tone. The results differ, however, to a limited extent, owing to differences in heat and in chemical composition. The colors will not be fully developed if underbaked, and they will be decomposed if overbaked. The color will be lightened by overbaking of the porcelain, either by chemical changes in the pigments or through the partial decomposition of the porcelain body. The weakening of the color, in the latter case, is possibly due to porosity. Porosity has a somewhat similar effect on light and color as has the pulverization of porcelain; that is, it mixes the various colored rays of light and thus produces white light. If all the essential requirements are observed, the operator need not fail on account of chemical changes in the pigments during the firing of the porcelain.

Porcelains are colored by metals and their oxids, and they are brighter, clearer, and purer in hue and tone than are the secondaries and tertiaries made by mixing two or more colored bodies. For instance, blues are colored with cobalt and yellows with titanium, but the result of their mixture is a broken or gray green, which will not be as pure a color as that produced by chromium.

THE LAYER METHOD COMPARED WITH OTHER METHODS.

The majority of porcelain operators are using the layer method, introduced by Dr. Reeves, in preference to other methods for the application of the body. There are reasons why the layer method is to be preferred. Porcelain bodies are all more or less translucent, and every layer of body, in succession, is influenced by the adjacent layers. The degree of

modification is principally dependent upon the thickness of each successive layer, upon its position in the inlay, upon the degree of translucency of the body, upon the hues and tones of color, and upon the intensity of the colors. These are all guides to the final result. The varying thickness of the layers has an influence on the final color, and a knowledge of that modifying influence is more easily acquired because we have the measurement of thickness as well as color, to guide us.

We get purer colors by the layer method, and the modifications in color are more easily understood. The direct mixture of the bodies, by absorption of additional rays of light, produces a greater percentage of black than would result from the use of the layer method. Light tints may easily be deepened by mixing but dark tones cannot be made much lighter. The raising or lowering of the tone is more readily controlled by baking in layers. The final color is produced by successive steps, and it is possible thus to make modifications at any stage up to the final layer.

The porcelain worker should experiment by making many combinations of colored bodies, in layers of varying thickness, and of mixtures. These combinations should be of varying intensities of hue and tone. Misgivings and doubts will soon disappear, and the operator will gradually work with greater confidence and skill.

INFLUENCES WHICH ARE UNCONTROLLABLE AND WHICH HAVE A TENDENCY TO DETRACT FROM THE BEAUTY OF THE COMPLETED FILLING.

There is a difference in the optical density and in the physical and chemical characteristics of porcelain and of a natural tooth, and for this reason it is impossible to so construct a porcelain inlay as to produce the same color effect of hue and tone under all conditions. Many influences modify the color—these are differences in the source of light, the position of the filling in relation to the source of light, the relation of the filling to the aspect from which the observation is made, and differences in the structure of the eyes of observers, etc. Therefore it is possible to produce an inlay which will exactly imitate the hues and tones of color of a natural tooth only under certain definite conditions. When these conditions change, the color will be modified. These changes, however, are usually so slight that if the inlay is a perfect match in hue and tone under certain ordinary conditions, it will not depart far from a natural and lifelike appearance under the varying conditions mentioned.

The color of an inlay is also modified —(1) By the variations in the composition and intensity of the light with which it is illuminated; (2) by the several kinds of contrast, as by contact with other colors or contiguity to them; and (3) by contrast of complementary colors from the ocular spectrum. The color of an object is modified by the light reflected from adjacent objects. The juxtaposition of its complementary color will raise a color to a higher point in the scale of tone. For instance, a gray green will assume a more vivid tone of green by the close proximity of red in the pink gum enamel. If an object is red under a pure white light, it will incline to orange if it receives green light from other objects. Yellow light added would make the tendency to orange more pronounced, but if the added light were blue or vio-

let, the red would become crimson or purple. If we look at a colored object and then turn our eyes to another, the color of the latter will be modified by the complementary of the first color. These are only a few of the influences which modify colors, and each has some bearing on our work.

The local color, or that which is dependent upon the nature of an object, is more constant if the surface of the object is rough than it would be if it were polished or glazed. Therefore an inlay should be fired until it is just short of a full glaze. A slightly uneven surface, as well as the full strength of the porcelain, can be developed by firing for a longer time, at a lower temperature, than would be required for developing a perfectly smooth, glossy surface. It should be glazed, and yet have minute conical elevations. These elevations on the surface of the porcelain reflect the light in all directions; hence the local color is not so greatly influenced by changes of position in relation to the source of light, by changes in the relative positions of the inlay and the observer, or by modifications in the source of light, as it would be were the surface highly polished or glazed.

EFFECT OF LIGHT OR EXCLUSION OF LIGHT ON THE COLOR OF A PORCELAIN INLAY IN RESPECT TO TONE.

When white is added to a color or hue, the result is a tint of that color or hue, and its intensity is weakened or lightened. Additions of black result in a shade of the color, and the intensity is saddened or made darker. Additions of white light have an effect somewhat similar to additions of white pigment, and exclusion of light results in a saddening or darkening, as though by additions of black. From these facts we conclude that the color of an inlay will be weakened or lightened by additional illumination; and if it be placed where the light will not fall directly upon it, the color will be darker. This teaches us that an inlay which is to be placed in a position where the light is unobstructed should be made slightly darker in tone than one which is to be placed in a less exposed position. Light transmitted through an inlay from the lingual to the labial surface also has a tendency to raise the color in the scale of tone, as well as to increase the luminosity of the color.

The tone of the color of a porcelain body can be lowered—or, in other words, a darker shade of color can be produced—by the addition of black or of neutral gray. However, this would have a tendency to change the hue as well as the tone. A colored porcelain body, mixed with another body of a different color, will produce a porcelain not only changed in hue, but one of a darker shade. The darkening is caused by the absorption of additional rays of light, as each pigment selects for absorption certain colored rays and emits others. Additions of a white body to a colored body will weaken the color; it will result in a slight change in hue and a change in the scale of tone.

CEMENTS AND THEIR MODIFYING INFLUENCES ON INLAYS.

The modifications in the color of an inlay after it has been cemented to place have generally been attributed to the effect of the shadow of the cement. This is misleading, if we understand it to mean the ordinary conception of a shadow. It has been said that this

shadow would not be present if we could obtain a transparent cement. When light passes through two media which differ in optical density it is refracted. If the cement absorbs a proportion of colored rays, complementary to those absorbed by the tooth and porcelain, a certain proportion of black will be formed; if the cement absorbs a portion of the light rays, there will be a decrease in luminosity; if the cement has the property of transmitting or reflecting considerable white light and colored rays which antagonize the effect of the porcelain colors, there will be a consequent change in the color of the filling.

These are not all the changes which might take place because of the cement, but they are sufficient to demonstrate that the modifications in color are not all due to what is generally understood as "shadow." They also demonstrate the fact that a transparent cement would not necessarily solve the problem. We require a cement that will have the least influence in changing the light rays as they are transmitted through the tooth, and that will cause as little change as possible from reflected rays. It should be of an optical density between that of porcelain and of tooth-substance, so that the light rays might be transmitted with as little change as possible. It could be as opaque as the tooth, and yet not interfere with the final result any more than would the tooth itself.

A knowledge of the various modifications caused by the cement can be more easily learned by using as few cement colors as possible. Skill in overcoming the modifying influences of one color of cement is more quickly acquired than if many are used. Cements which differ in chemical constitution or in crystallization also differ in their optical effects. It is therefore easier to acquire a knowledge of these effects by using one variety of cement than by using many.

It is only through a knowledge of optics, especially in relation to light and color, that the porcelain worker will be enabled to solve perplexing color problems. A complete explanation of each phase of the subject of color and its relation to inlay work could not be given in a short treatise; the writer has therefore confined his remarks to a few of the fundamental questions.

Discussion.

Dr. J. Q. Byram, Indianapolis, Ind. I dislike to begin my remarks by complimenting the essayist, but I cannot help sincerely congratulating him upon this paper. I have contended for a number of years that if we are to do porcelain work in an artistic manner we must familiarize ourselves with some of the basic principles of the physics of light. One of the causes of discouragement in porcelain work has been the difficulty in obtaining the proper colors, and it is my belief that this difficulty arises largely because the operator does not comprehend the first principles of color formation. We must bear in mind that color is a sensation, and that it is produced by light coming in contact with pigments; that a certain amount of this light is absorbed, reflected, transmitted, diffused, or refracted, and that owing to these various phenomena we have the various hues of color. We are asked, Why should this knowledge help us in porcelain work? Unless we are able to comprehend just what effect light will have upon the inlay, it is really hard to tell just what to do. I believe that the essayist knows more about the physics of color than any

dentist with whom I have come in contact. He has studied this subject for a number of years, and he has given to us tonight a paper which shows that he has gone into his subject in a scientific manner. It is therefore very hard for me to discuss this paper, because the essayist has stated facts, and when facts are stated it is very hard to start a discussion that does not agree with them.

I have made a few notes, however, and care to speak only of a few points. If we are to do porcelain work, we must learn something about colors. It has been my experience that most of us do not comprehend just what colors are in teeth. When we look at a tooth, we really do not know what conditions actually exist; we take our shade guide and porcelains and then try to mix a few colors and have them come out so as to imitate the tooth, and if they do not, we are discouraged. My method of constructing inlays differs just a little from the one given by the essayist. While I do build inlays in layers, if you please to term it so—I prefer to call it building them in sections—it has been my experience that it is almost impossible to build inlays in layers in the sense that we speak of, one layer over another, and bring out the colors. It is a physical impossibility to build one color over the other and have the strength of these colors so divided that one will not affect the other. In other words, if I take two pieces of colored glass—for instance red and blue—the inference is that if I hold them so that the light may be transmitted I ought to obtain a violet color; but the color will not be violet. The strength of the pigment in the red will absorb the blue so that there will be a modified red. Instead of building inlays in layers, that is, starting with one color and placing another over it to bring out the proper color, I prefer to make them in sections, so that the colors will blend into each other.

The essayist speaks of the low-fusing pigments. While I am still a high-fusing porcelain advocate, I am frank in saying that I now use more low-fusing porcelain than I did a number of years ago. If in either case the porcelain is overfused, the color is thereby affected. If any porcelain is properly fused there is, I believe, no advantage in the method that the essayist mentions.

There is one other point to which I should like to call your attention in the construction of inlays, and which the essayist did not mention. In the construction of the inlay, the foundation should be coarser than the enamel. If I am using low-fusing porcelain, I apply a specially ground porcelain which is coarse. This porcelain is applied and fired to only a high biscuit, and then the enamel is placed over this and properly fused. When the light is transmitted through the enamel to this coarser porcelain, it is diffused or broken in such a manner that when it strikes the cement there is less change of color. As the light passes through the dense enamel to the coarser porcelain, it is refracted or broken, and more of it is really absorbed, and in that way there is less of it to be reflected from the cement. I never fire the foundation to a glaze, leaving it as nearly as possible in a condition of hard biscuit.

There is no question that inlays are affected by artificial light. If we go into the physics of color, we can readily see why this is true. I dare say there is not one present who has not experienced difficulty in matching colors of porcelain or other articles in artificial light.

I agree with the essayist that the fewer

cements we use the better. I have contended for a number of years that all approximo-incisal inlays should be set with white cement. It is simply a question of physics; white reflects, and colors absorb light. If we have a cement that will reflect and not absorb light, there will be far less change of color than when the light is partially absorbed and then reflected. The principle is different in small inlays on the labial surfaces. Take as an illustration the labial surface of a central incisor, and use a cement which imitates that section of the tooth; the cement and the porcelain are almost of the same color, and consequently there is practically no absorption of the light-rays, because that which has been transmitted through the porcelain is reflected. I have done inlay work for many years, and I am frank to admit that I am not successful enough to make two or three mixtures of cements and have the color cements come out as I want them. For this reason I prefer to work with white cement, and thereby have the least possible amount of color change.

Dr. Chalmers J. Lyons, Jackson, Mich. It is certainly a great pleasure for me to assist in the discussion of this most excellent paper. Knowing the essayist as I do, I feel that the ideas that he has presented to you are not fanciful dreams, but the results of scientific study and experimental research covering a long period of time. The porcelain operators of today owe to Dr. W. L. Fickes a debt of gratitude for the work he has accomplished and given to the profession along the line of color problems in porcelain.

He has pointed out that in order to comprehend and apply the principles of colors in porcelain work the fundamental principles of light have to be reckoned with.

The relation of color to light is much the same as that of music to sound; color has its many hues, its long scales of tints and shades, its true and false chords. Mere sound gives us little pleasure; if developed, however, to its highest form—music—it thrills.

In the same way with light, our enjoyment culminates at the glories of color in a flower, or of a sunset, or of some of Nature's paintings.

The harmonies of light have not been as thoroughly studied and classified by scientists as those of sound. If they had been, the porcelain operator would have less difficulty in imitating the different tones of color in the natural teeth. The essayist well says that the ability to imitate the various hues and tones of color of a tooth depends as much upon our susceptibility to the various gradations of color as upon our skill in the manipulation of the materials.

It is a well-known fact that there are some individuals with such perfect organs of hearing that they are able to distinguish the slightest sounds, who are yet so utterly unable to distinguish between two tones or between the harmonies and discords of music that they are said to have "no ear." In the same way there are those whose eyes are well formed for seeing all distant objects, but who are unable to distinguish between the hues and tones of color, and may be said to have no eye for color.

To successfully comprehend and apply colors in porcelain, one must first have an eye for color. Then the eye can be developed to distinguish the finer hues and tones only by close application to the work, and by observation and scientific study of colors.

I quite agree with the essayist when he says that the operator need not fail in obtaining the proper colors on account of the chemical change taking place in the pigments during the fusing of the porcelain. There is more danger of failure in bringing out the proper tone of color in the process of fusing the porcelain by not obtaining the proper surface gloss, than there is in chemical decomposition of the pigments taking place. If the surface gloss of the porcelain inlay is not the same as that of the natural tooth, then the reflection of light will be different and the appearance changed.

If the inlay be underfused the required reflection of light will be lacking. If the inlay be overfused and a glossy surface be produced, the reflection of light will be too great, and the inlay in either case will not match the tooth in tone of color, even though all the pigments are preserved in normal condition in the porcelain and in the right relation for that particular case.

Regarding building the porcelain enamel up in layers in inlay work, I doubt not that the layer method is the best for the porcelain operator who has had long experience and who has made the study of colors and of color combinations a part of his daily work, but to the man with a limited experience in color combining, it seems to be too indefinite for practical application in porcelain work.

As the essayist says, every layer of body in succession is influenced by the underlying layers, and the degree of modification in color is principally dependent upon the thickness of each successive layer, the degree of translucency, hue, and tone of color, and intensity of colors.

He says these are all guides to final results. So they are to the scientific colorist, to one who has had long experience in combining colors either in chromatic art or ceramic art, whose experience may signify to him just what tone of color a definite enamel color applied in a definite thickness of layer will bring out if applied in a certain position in the inlay over another layer already applied and partially fused. To the novice, however, or to the porcelain operator with a limited experience, these things are necessarily indefinite, and in building up in layers the thickness of the layer and the intensity of tone of color of that layer is necessarily guesswork to a greater or less degree, and the final results are many times disagreeably surprising.

It is my opinion that for the beginner in porcelain work, or for the porcelain operator who has not had the opportunity to make a scientific study of colors and color combining, the method of building up the inlay in sections will be the most satisfactory and the most successful. This is accomplished by building in with the foundation body that part of the inlay which is to represent the dentin and firing it to a high biscuit; then the gingival third of the inlay is built in with the tone of color of the gingival third of the tooth, then the middle third, then the incisal third —the layers, however, should not overlap each other. The inlay is completed with a uniform color.

While in a measure this method may be considered a layer method, yet on account of the enamel layers not overlapping each other, the influence upon the tone of the color produced by those underlying layers is not as great as in

the layer method introduced by Dr. Reeves, whereby one enamel layer overlaps the other.

It is true that under different illumination the inlay will appear differently as far as the color is concerned, and as the essayist says, it is possible to produce an inlay which will exactly imitate the hues and tones of the color of the natural tooth only under certain definite conditions. The position of the inlay in the tooth with reference to the source of light must always be taken into consideration before attempting to build up the inlay with the colors. An inlay on the distal surface should usually be made lighter in tone of color than one on the mesial surface, for the inlay on the mesial surface receives the rays of light less obstructedly than the one on the distal surface.

Regarding the modifications in color of the inlay after cementing to place, I have found that if the inlay is so constructed that the light cannot penetrate to the cement unchanged, the color is not so greatly modified.

The dentin of a natural tooth under a high-power glass has the appearance of having a rough surface. I have found that the more nearly that rough surface can be imitated with the foundation body which is to represent the dentin, the less the color of the inlay will be modified by the cement.

The reason for this is that the rays of light are broken up at the junction of the foundation body with the enamel or at the rough surface, and instead of the rays of light passing straight through to the cement, we have a diffusion of light, and instead of all of the light being refracted, reflected, and absorbed, a part at least is diffused in the same way as in the normal natural tooth.

I accomplish the preservation of this rough surface on the foundation body in one of two ways—*i.e.* either by using a Consolidated body for the foundation, firing to a high biscuit and not at any time thereafter fusing, and using Brewster or S. S. W. body for my enamel colors, or by leaving the foundation body rough, by roughening the surface after the surplus water has been absorbed, then firing to a hard biscuit and at no time overfusing the foundation body, and by fusing the enamel to complete the inlay.

I have been able to get splendid results with these methods of procedure in applying the foundation body, and I firmly believe that the nearer we can imitate the appearance of the normal dentin with the foundation body, the nearer we can come to procuring the color of the natural tooth with our inlays.

Dr. Joseph Head, Philadelphia. Dr. Byram has covered the subject so thoroughly that he has left little for me to say. I only wish to remark that this subject is of intense interest to me, and has been most scientifically and carefully gone into by the essayist. He has refreshed our minds on many things that have come to us in porcelain work, and has also added much new and valuable material. There is one question, however, that I should like to ask. He mentioned that in pure white light a certain effect is produced, and I wish he would explain what he means by pure white light. The point is this: Heretofore I have considered white to be composed of all the colors; it is practically a surface reflecting equally the three primary colors. One always slightly predominates or is reflected from the surrounding objects. The ordinary white colors that we use in porcelain are yel-

lowish white and bluish white. The nearest approach to white is white with as little adjacent reflected color as possible. It has been my experience with yellow that it is a brightener, and that to a certain extent it takes the place of light. You will notice that artists in painting a picture, when they want an intense light will put on a touch of clear yellow. It has been my experience with fillings in the posterior surface of a tooth where there is a shadow, that yellow cement will cause a brightening which to a certain extent counteracts the shadow.

Dr. Byram. Will you explain what you mean by the term shadow?

Dr. Head. Shadow, as I understand it, is where the light is shut off by any substance whatever. It is the absence of light; that is, I think, the scientific meaning of the word shadow. It has been my experience that shadow is more in the nature of a gray. Yellow will more readily counteract gray than anything else. The question of the shadow is something that I think none of us have any difficulty in understanding when we are backing a tooth.

Dr. Byram. That is not shadow; that is reflection, which is altogether different from shadow.

Dr. Head. Don't you think that the coming through of the substance has something to do with it? Is not the luminosity taken away?

Dr. Byram. That does not necessarily make a shadow. As I understand it, shadow is the exclusion of light.

Dr. Head. It does not mean the same thing, but a similar thing. Is not lack of reflection lack of light, therefore in the nature of shadow? Suppose you take an ordinary natural tooth, and break the corner off. There you have the same substance, and still, if you cement that broken piece on and turn the corner away from the light so that the light is shut off by that line of cement, you have a shadow.

Dr. Byram. That is exclusion of light. I cannot see that that is a shadow.

Dr. Head. What is a shadow, then?

Dr. Byram. I do not know.

Dr. Head. I think it is the exclusion of light. If not, I should be glad if you would tell me what it is. There is another point to be discussed with regard to layers. I have not been as successful in making small porcelain fillings in layers as some others. Some can take a pinhead filling and make it in three layers, and get just the proper differentiation of colors from this porcelain and cement, but I need a good-sized filling before I can make it in layers.

I believe what the essayist says in regard to the use of pure colors. The point is that if we make inlays in layers, we mix the two colors, so that they will come out as pure colors side by side, which gives us a light effect that is very satisfactory. My experience is that when two porcelains are put together there is not a sharp line between the colors but a blending, and sometimes I have made inlays in this way in which you could not tell whether they were made in layers or not. It looks as though it were one color, and that is very apt to be a different color from what you want. My experience is that I can better secure the desired colors by taking two colors and working them side by side.

Dr. C. H. Land, Detroit, Mich. All this light problem is too theoretical. In the first place, talking about light, what is light? In one sense, it is a species of vibration. It has not so much to do with the color problem as we talk about.

All I want are four foundation colors in porcelain work, and I shall mix and blend them in such a way as to get twenty shades and tints, and put them in any place desired. It is common knowledge that all tooth manufacturers blend colors, and we find two or three colors in every tooth which they make. That is not new. Light brought from the back of the tooth forward is reflected light. Light thrown on yellow is absorbed light, and that is why yellows do not give any trouble. The whole trouble is simply that you cannot secure enough depth for the porcelain in an inlay in an approximal or labial cavity, and any substance that is opaque or in which the light is reflected from particles that are not translucent will throw back their opaque shadows and thus interfere with the translucency of the colors. The trouble is that we are talking too much about colors and lights. I do not want more than four basic colors to get the correct color of the majority of teeth used, and the ones that trouble you most are the light-colored porcelains. I used inlays for two years, until I found the trouble, and then I almost entirely abandoned them, because it was utterly impossible to get translucency in any porcelain of thin layers. If you have yellow teeth and use a small amount of cement, you will not be troubled with the so-called theoretical color problem; there are no problems connected with them. I have been handling porcelain for forty years and have not found that trouble, nor do the dental manufacturers find any difficulty. With the colors employed by them you do not find any trouble in matching teeth, do you?

Dr. Byram. We certainly do.

Dr. Land. You do not have a great deal of trouble. If you do, I am sorry for the manufacturers and for the rest of the profession, and I do not believe that any of you could accomplish any more than the dental manufacturers have in manipulating colors. These papers are scientific, but what do we want with all this verbose theory of light in ordinary porcelain work? I do not need it. I am not ashamed to say so, and I am not afraid to demonstrate my statements by practical tests. What we want is depth or translucency when we work with porcelain. Throw your inlays aside, and when you learn to cap teeth over the natural roots so that you will have depth and translucency, you will have no more color problems, nor any more cavities to bother you. I am talking from facts. First, I will prove that it is impossible to make a thin piece of porcelain of any description show the proper color when it is cemented in, or when a piece of metal is put back of it. It is just the same as tobacco stain coming through and discoloring teeth on the lingual side. What you want is translucency. That is, whenever a vitreous compound is fused to that point where you can see through it, as in the natural teeth, then you have imitated nature. It may be a yellow tooth or a tooth with a yellow tint; it may be a dark grayish looking tooth or a stained tooth. The teeth of a person who chews cloves, for instance, are stained through and through, and also in people using tobacco, the color of the teeth is ruined in that way.

The reflection of light is largely due to uneven surfaces. We do not see the transparency of the diamond or the translucency of agate before the rough surface is reduced to a perfect plane.

One of the gentlemen refers to a state of biscuit in teeth. Does he know what a biscuited tooth is?

Dr. BYRAM. I think I do.

Dr. LAND. Will you give us the definition?

Dr. BYRAM. Porcelain fired to the point of shrinkage and not glazed.

Dr. LAND. Then it is not thoroughly vitrified?

Dr. BYRAM. No, sir.

Dr. LAND. We call teeth biscuited when there is nothing but the paste in them. The real question of utility is answered by the state of vitrification more or less, and the term biscuit should not be used. If I take a vitreous mass, porcelain, china, or common clay, and raise the temperature sufficiently, I can impart to it a transparent glaze so that you can see the other side of it, but the less thoroughly vitrified the mass is, the more closely I approach porcelain; when it is fired to a biscuit merely, it is opaque; in this mass that you speak of you have a surface through which you can filter water, and until you put the glaze on china you have a fired biscuit.

It is a fact that the most perfect porcelain in the world is the dental porcelain. We have three hundred variations of vitreous masses that are called porcelain, but the scientific pottery men only recognize three, the German, the English, and the French, calling the others semi-porcelains or china. The name porcelain means a translucent piece of pottery. None of these are called porcelain when they are in a state of partial vitrification, or biscuit. We have the truest porcelain in dentistry, because when we bring it to that state of vitrification in which it is translucent we rightly call it porcelain, and not before. This is what we find in the natural teeth. If we put the electric light back of them, we find a translucent mass. Teeth are not like pottery, because as soon as we reach the natural state of translucency we have developed the ideal mass. Loss of color, opacity, and a frail mass is found when it comes to low-fusing porcelain, because we have added potassium or sodium to reduce the fusing-point, and the more of that we put in, the farther away we get from true porcelain. The pigments are destroyed by flux, and the true porcelains are those that contain the least amount of artificial flux. In my investigations of porcelain I have realized that the dental porcelains have more right to the name of porcelain than any other vitreous mass in the world, and our high-grade artificial teeth represent that high-class porcelain. The high pigments, such as titanium and platinum pigments, are put in these and are not affected by low firing and are used to the best advantage in them.

I do not believe that it is necessary to say any more on this subject. I have done porcelain inlay and contour work for twenty-three years, and I feel sure that I am the originator, for no one else has ever claimed this title. I have almost abandoned inlay work because of the difficulty of preventing the cement from transmitting its opacity through the porcelain. You want sufficient body, and sufficient depth, and when you have these you have strength and natural appearance; if you then use a minimum amount of cement, your shadow difficulties will be overcome.

Dr. BYRAM. No one admires Dr. Land more than I, and I believe that no one has given him more credit for what he has done in porcelain work than I, yet it has grieved me to hear a veteran of the profession say before a

scientific body that this thing and that thing is nonsense. Are we to be scientific dentists or mere tooth-carpenters? Now, Dr. Land in his discussion shows that he realizes the principles of light. Yet he assures us it is nonsense, and spends fifteen minutes in telling us how certain factors will act in porcelain work, which is just what we have been trying to have the profession realize. Dr. Land does not realize that he has been experimenting for twenty-three years and has learned by sore experience. His failures have taught him these principles, and yet he claims that these principles are of no account. I admire Dr. Land, but I believe that such discussions as his should not be permitted to go into the proceedings of a scientific body.

Dr. Fickes (closing the discussion). I think Dr. Byram said that he has never had any trouble with low-fusing porcelains except in the fusing of them.

Dr. Byram. I said if I could get the porcelain properly fused.

Dr. Fickes. That you did not have any trouble with the color. The difficulty encountered in properly fusing is the principal reason why the low-fusing pigments cause constant trouble. They change color more readily than do the high-fusing pigments, by being either oxidized or reduced. To obtain a greater variety of colors, many pigments are used in coloring porcelains which are unnecessary, and which are of disadvantage because of their liability to decomposition, or to mutual chemical action when mixed.

I do not find anything to criticize in the remarks of Dr. Byram. We do not agree entirely, however. I do not understand how coarsely ground porcelain would have the effect that he says it would have. The smoothness or roughness of the surface of a body has more to do with its color manifestations than have any other of its physical characteristics. If the roughness is on the cavo-surface of an inlay, it would have much less influence in controlling the local color than it would have if it were on the outer surface.

Dr. Head asked what I meant by white light. Solar light is usually called white light, although that is not strictly true, because it is not constant but continually changing. When light-waves of a single wave-length act on the eye, a color sensation is produced which corresponds to a definite position on the normal spectrum. When waves of all possible lengths act on the eye at the same time, a sensation of white is produced. Solar light is usually made up largely of white light. That is, the waves are of all possible lengths, which act on the eye simultaneously, thus producing a sensation of white, which modifies the color sensations from other waves. A pure color is entirely free from white light, and it is said to be impure if a proportion of white light is mixed with it. This can be illustrated by the effect of sunlight on colored tile. When the tile is not highly illuminated, the local color is to be seen, but if the sun is shining brightly, and the angle of incidence is near the perpendicular, none of the local color can be seen. The colored rays from the tile are mixed with the white light from the sun, and the result is a tint of the color which approaches pure white. The greater the proportion of white light, the less pronounced is the hue of the color. We observe this same effect on a porcelain inlay. If you throw a very bright white light on a porcelain inlay, no mat-

ter how intense or pure the color is, it will make that porcelain appear so light that you will think it is almost white.

I believe that Dr. Head practically bakes in what we generally call layers, although he does not call it so. I do not like the term layers, because we really place the colors in patches, so that their combined effect produces the color desired.

I have the highest respect for Dr. Land's work, of which I have frequently had occasion to speak; but I was very sorry to hear him make such statements in regard to light and color. I agree with him on many points in practical porcelain technique, but when he speaks of light and color, he either does not understand the nomenclature or else he is entirely wrong. I only stated principles in my paper, and then tried to interpret these principles in their application to porcelain work. Dr. Land questions the truth of these principles, as well as my interpretation of them. He freely interchanges terms which are antonyms rather than synonyms, which shows that he does not use the words properly; it would therefore be useless for me to try to answer him.

In regard to the meaning of the word shadow, I would say it is a very misleading word when used in connection with inlay work. I have here an instrument with which I suppose you are all familiar. There are two crystals of tourmaline in these tongs. If you turn them so that the optical axes are parallel you can see through them, but if you cross them the light is entirely cut off, and they appear opaque. This is an illustration of polarization by absorption. The light is doubly refracted by each plate; one of the two sets of waves is absorbed, and only that set of waves whose vibrations are parallel to the optical axis is transmitted. When the plates are crossed the light transmitted by the one is absorbed by the other, and the light is cut off, although each plate is transparent. I do not mean to say that we have this effect in inlays. We do have shadows, but the opacity of the materials is not the only reason for the changes in color; there are other influences which have as much to do with the changes of hue and tone as has the cutting off of the light, and. as illustrated by the tourmaline tongs, the absorption of the light or shadow does not necessarily mean that it is caused by the opacity of the materials.

Dr. LAND. I wish to say that any words which I may have used in an extemporaneous way that sounded impolite or wrong, I am willing to correct. I have the utmost respect for this scientific paper, and I did not wish to be understood otherwise. I maintain, however, that it was translucency that I meant in one instance of my remarks, and not transparency.

Dr. FICKES. I did not mean to convey the idea that I objected to Dr. Land's remarks. I will say, however, that nearly everything he said in regard to light is opposed to the well-known laws of light, and for that reason I do not believe that his ideas were expressed by the words he used. He said that light had nothing to do with color. Any scientist knows that light has everything to do with color.

Dr. LAND. Can light change color?

Dr. FICKES. It certainly can.

Dr. LAND. It can be reflected in different ways, but it does not change the color.

Dr. FICKES. A change in the source of light, a change in the surrounding con-

ditions such as would modify the light reflected from other objects, and many other changes of light will modify the color. We may say that color is light, because without light there is no color. The physical and chemical structure of the object affects the light, and that which is emitted from its surface to the eye affects the optic nerve and the retina, and produces the sensation of color. If this does not mean that light has everything to do with color I do not know what it does mean.

Dr. Byram is on a committee on nomenclature, I believe, and I would suggest that he use his influence to teach the proper use of the words shade and color. They are used as synonyms, but they should not be so used. So-called "shade guides" might be more properly called color guides. People usually mean color when they speak of shade.

Dr. DUNNING. I think we are all interested in the result of the proposed tests which Dr. Head has consented to make on freshly extracted teeth to determine the value of the compound which he advocated in his paper for dissolving tartar, and I therefore move that a committee of three, including Dr. Dailey, be appointed to confer with Dr. Head for that purpose.

The motion was carried, and the chair appointed the following committee: Drs. W. B. Dunning, A. H. Merritt, and W. M. Dailey.

On motion Section II then adjourned until a later session.

THURSDAY—Afternoon Session.

Section II was called to order Thursday afternoon at 3.30 o'clock by the president, Dr. Carr.

The first order of business was the report of the committee appointed to make experiments with hydrofluoric acid, as advocated in Dr. Head's paper, previously read before the section, and in accordance with Dr. Head's and Dr. Dailey's experiments, as follows:

REPORT.

Experiment No. 1. The best teeth obtainable on such short notice were old, dry, decayed teeth, covered with hard lumps of calcic deposits. These were dropped in the following solutions: (a) Pure hydrofluoric acid. (b) Fifty per cent. of hydrofluoric acid diluted with water. (c) Twenty-five per cent. of hydrofluoric acid, diluted with water.

After allowing them to remain in these solutions for six hours at an ordinary temperature, the teeth were removed, dried, and examined. The calcic deposits on all specimens had softened, some particles falling away, other particles remaining in position, all being of a cheese-like consistence, removable by the finger-nail. Much of the pericementum had been removed, though some shreds remained. The enamel and cementum, as far as the naked eye could detect, were unchanged.

Experiment No. 2. One freshly extracted tooth, the occlusal surface of which was much worn so that a considerable amount of dentin was exposed, the root of which was covered with a heavy calcic deposit, and the enamel of which was highly polished, was placed in Dr. Head's solution of hydrogen

ammonium fluorid and left for six hours, then removed and dried. Upon examination the tartar was found to be still in position, but of cheese-like consistence. The exposed dentin was somewhat disintegrated. The enamel and cementum, as far as the naked eye could detect, were unchanged.

With regard to Dr. Head's representation concerning the action of hydrogen ammonium fluorid, the committee is unanimously of the opinion that it is correct.

With reference to experiment No. 1, your committee would further report that the findings were at variance with the experiments made by Dr. Dailey; and as, with Dr. Dailey's specimens, the deposits remained hard after thirty-six hours of immersion, we are forced to the inference that the solution used by him was other than pure diluted hydrofluoric acid.

Respectfully submitted,

WM. B. DUNNING,
Chairman.
ARTHUR H. MERRITT.

Dr. JOSEPH HEAD, Philadelphia, Pa. During the discussion of my paper yesterday, Dr. Kirk made the statement that he was convinced that the solution that I used is a mechanical mixture of hydrofluoric acid and ammonia; he claimed this to be the case because, as he said, hydrofluoric acid was a monobasic acid, and therefore it was impossible that there should be a bifluorid salt. I have here an extract from Remsen's Chemistry on the subject that will be of interest in this connection (Remsen, fifth edition, 1907, page 179):

Constitution of hydrofluoric acid and the fluorids.—Hydrofluoric acid forms two series of salts, corresponding to the two general formulas MHF_2 and M_2F_2 or MF. The former, of which the salt KFH_2 is an example, are called acid fluorids, the latter simply fluorids. The fluorids are commonly represented by the simpler general formula MF, though it appears probable that the doubled formula is correct. It will be seen later that fluorin forms a large number of so-called double salts or double fluorids, which it is difficult to explain in any other way than that they are derived from the acid H_2F_2. Thus cryolite, to which reference has been made, is called a double fluorid of aluminum and sodium, and is generally expressed by the formula $AlF_3.3NaF$, which means simply that in some way aluminum fluorid is combined with three molecules of sodium fluorid; but it is difficult to see how this union can be effected without assuming that fluorin has a greater valence than one.

Now, the difference of opinion is not a difference of opinion between myself and Dr. Kirk, but between Dr. Kirk and Remsen, and I cannot help feeling that Remsen has somewhat the better of it, since all over the country at the present time manufacturers are manufacturing and selling these bifluorid salts.

The next order of business was the reading of a paper by Dr. G. W. WELD, New York, N. Y., entitled "Characteristics of Calcified Tissues in Two Complete Sets of Human Teeth Free from Caries," as follows:

Characteristics of Calcified Tissues in Two Complete Sets of Human Teeth Free from Caries.

By G. W. WELD.

WHATEVER practical or scientific thought may be contained in this paper is partly due to the author's reading of what others have accomplished. I appear before you in the guise of an opportunist, for there is but little merit or distinction in presenting the casts of two human sets of teeth to this association, even though

the originals be free from caries. They have cost me but little time and labor; they form an interesting exhibit, as they suggest problems of susceptibility on the one hand and immunity from caries on the other, and as perhaps some instructive conclusions may be drawn from them. I wish to say at the outset, however, that I find myself somewhat inclined to be empirical in some things, and perhaps iconoclastic in others, although it will be my endeavor to build up, rather than to tear down.

FIG. 1.

Case I. "Hard teeth." Showing upper and lower jaws in occlusion, with slight malocclusion of the anterior teeth.

HISTORY OF THE TWO CASES.

The plaster casts, as you will observe, represent two phenomenal sets of human teeth, both differing in appearance and apparently in structure, very similar and yet very dissimilar in many respects. I shall give their individual histories as briefly and succinctly as possible.

Case I.—The person under observation is a saloonkeeper, single, of Irish descent, fifty-two years of age, with no specific history. He has never been ill, excepting for periodical attacks of headache. His temperament is of the nervo-sanguine type. He has never required the services of a dentist, excepting once in two or three years, when accumulations of tartar were removed and the teeth were polished. He has never paid any particular attention to oral hygiene, uses a tooth-brush once a day, but no tooth-washes, unless *aqua pura,* and whiskey he considers in that class. He keeps late hours, smokes and chews tobacco, drinks all kinds of alcoholic spirits, and sometimes to excess. Nevertheless, he has in his mouth today thirty-two sound teeth, not one of them being in the slightest degree affected by caries. There are no fissures to be found in his teeth large enough to admit the introduction of the finest point of an excavator or apparently to afford a dwelling-place for any colony of bacteria. His saliva is generally neutral, although it shows an acid reaction at times, but free from mucus. The only blemish upon this set of teeth, as you will observe, is a slight mechanical abrasion on the edges of the buccal surface of the lower molars.

From a close observation of these teeth

in relation to their physical characteristics, there would seem to be every indication that they represent what the practical dentist would call "hard teeth;" *i.e.* there is presumably a preponderance

Fig. 2.

Fig. 3.

Case I. Showing occluding surfaces of the upper and lower jaws.

of the calcium phosphate or perhaps it may be said, more perfect calcification. For fifty-two years, or at least since the eruption of the permanent teeth, they have been immune from the attacks of the acid-producing bacteria.

Case II.—The person under observation is an American actor, married, forty-one years of age, with no specific history. He has generally enjoyed good health, but has been occasionally afflicted

Fig. 4.

Case II. "Soft teeth." Showing upper and lower jaws in occlusion.

Fig. 5.

Fig. 6.

Case II. Showing occluding surfaces of the upper and lower jaws, with chemical erosion.

with rheumatism. His profession has called him into different parts of the world, with of course different climatic conditions; his temperament is of the nervo-sanguine type; he has never required the services of a dentist, except for an occasional polishing and beautifying of the front teeth. In fact, in this case as well as in the first case, there has never been any great accumulation of tartar, and of course not the slightest indication of any calcic inflammation of the pericementum; his saliva is continually acid, with an absence of mucus. He has paid but little attention to oral hygiene, has brushed his teeth in a perfunctory sort of way once a day, but to no great extent has he made use of dentifrices. He is a typical man about town, and I might say, about the world; he smokes and drinks in moderation. He has in his mouth thirty-two sound teeth, sound at least as far as caries is concerned. Observation, however, reveals that they are affected by chemical erosion. This is well marked in both jaws, from the third molars behind to the median line in front; some of the teeth have been worn down almost to the "quick," and yet up to the present time, he has never suffered any inconvenience.*

For a period of forty-one years, or since the eruption of the permanent set, his teeth have been immune from caries. All indications in this case would seem to point to what the practical dentist would call "soft teeth"—that is, a presumable preponderance of the calcium carbonate, or calcification less dense than in case I.

* Case II is borrowed from Dr. B. W. Smith, 127 W. 48th st., New York, who has kindly permitted the writer to use the same in this paper.

PROBABLE COMPOSITION.

There is more or less speculation regarding the composition and textural strength of these two different sets of teeth, for of course no chemical analysis showing the percentage of calcium salts they contain has ever been made. But the practical dentist with an educated and delicate touch requires no analysis of such teeth. Instrumentation tells him that in the one case he is operating upon teeth so dense in structure that when the cavities which they contain have been properly excavated and filled, they will be preserved for many years. In the other case he recognizes a soft structure, and his experience teaches him that to pursue the same line of treatment as in the former case would be a mistake, and that he would be doing an injustice to his patient.

The practical carpenter requires no microscope to tell him the difference in structural strength between a piece of pine wood and a piece of lignum vitæ.

The blacksmith requires no polariscope to tell him the difference between soft iron and steel; the hammer and cold-chisel is all that is necessary.

The practical miner has no use for an apochromatic lens to determine the textural strength of the different rocks that he examines.

The so-called empirical dentist is satisfied that he is living a life of usefulness, and although he is unrecognized as a scientific thinker and his methods may differ from those of his so-called scientific brother, he nevertheless conscientiously believes that he saves many teeth.

The theory has been advanced by one or two dentists that in case II, that of the actor, the result might be due to

the stress of occlusal contact from a habit of gritting the teeth during the excitement of gesticulation and excessive grimaces in the rôle of a tragedian, thus leaving it to be inferred that the loss of tooth-substance resulted from mechanical attrition rather than from chemical erosion. But the occlusal aspect of the case, the exact locking of the articulation, and the apparent movement of the mandible would seem to preclude such a supposition.

Aside from the apparent difference in the physical characteristics or in calcification with immunity from caries in these two cases, they seem to bear out with a surprising and beautiful confirmation that can hardly be gainsaid at least two of Dr. Black's conclusions—*i.e.* first, that the "differences in density or in percentage of lime salts in the teeth have no influence as to their liability to decay," and second, "there is no basis for the supposition that calcic inflammation of the peridental membrane or phagedenic pericementitis (so-called pyorrhea) attacks persons who have dense teeth in preference to those whose teeth are less dense."

I shall have occasion to speak of Dr. Black's conclusions later.

EXPERIMENTAL STUDIES IN THE LABORATORY.

Let us take up one or two points relating to the minute anatomy and the composition and the possible arrangement of the calcium salts in the enamel of the human teeth. In doing so, I trust you will pardon my speaking of a few experimental studies of my own, made a number of years ago, which seem to bear upon the subject. I allude to them, not that they may prove of very much importance *per se,* but because they will aid me in leading up to what I wish to say and to the conclusions likely to follow.

Doubtless some of you will recall the discussions and the views held at one time by Dr. Karl Heitzman and Dr. Boedecker concerning the presence of organic matter in the enamel. They believed that the enamel contains organic matter in the form of enamel fibers, which passes between the enamel rods and sends branches into both interprismatic substance and prisms. These views were opposed by Dr. Williams and other dental scientists.

At that time I was a student of microscopy in the laboratory of Dr. Heitzman. I think that one or two who are present here tonight were members of that class. At any rate, I recall the names of Atkinson, Abbott, Boedecker, and Starr, who were members. The class was organized for the exclusive study of the minute anatomy of tooth-structure. One evening, after Dr. Heitzman had demonstrated the interprismatic spaces and isolation of the enamel rods, I asked permission to make a similar demonstration myself. The technique employed at that time for the decalcification of the hard tissues was to embed in paraffin and immerse in a weak solution of chromic acid, if I am not mistaken, and to allow it to stand for a month or two; a thin section was then cut off by the microtome and carefully transferred to the microscopic slide. It was then found that a greater portion of the intermediate cement substance had been dissolved by the action of the acid, and that the enamel rods were more or less isolated.

For my own experiment and demonstration I had previously prepared a very thin section of dry enamel. Placing this

section upon a slide, under a cover-glass, and arranging the proper focus—the magnifying power was about five hundred diameters—I painted over the section by the aid of blotting paper and capillary attraction a six per cent. solution of acetic acid. In one minute's time the interprismatic substance was completely dissolved, and the current of acid flowing over the thin section had made up a heap of the enamel rods, which presented the appearance of a bunch of sticks. This is a pretty experiment, and one that can be observed by the eye from start to finish. Dr. Heitzman was gratified because, as he remarked, it changed the technique from the rate of a stage-coach to that of a limited express.

By a mere coincidence, I discovered at that time that a six per cent. solution of acetic acid would dissolve pulverized calcium carbonate, without having any immediate effect, at least, on calcium phosphate. The query was raised at the time whether or not, after all, the interprismatic substance might not be composed of the calcium carbonate, and the enamel prisms of the calcium phosphate. We know that in some geological formations we find a crystalline rock consisting of granite, feldspar, and mica, arranged in planes, so that it breaks easily into coarse slabs, and sometimes cemented together with a rocky material, perhaps calcium carbonate, less dense. Be that as it may, it is evident that the resisting powers of the interprismatic substance and the enamel prisms against the action of acids correspond in degree to that of calcium carbonate and calcium phosphate respectively.

If we could only devote a little more time to scientific researches, doubtless many mooted questions would be made clear.

I sometimes think, in this connection, that the greatest mystery in this world, outside the composition of the enamel of the human teeth, is the extreme brevity of human life; for oftentimes, when a discovery is made which promises to be of great benefit to mankind, when the efforts of the scientist have been crowned with success, and he is about to receive the thanks of his friends and fellowmen, he is suddenly called away—like the great scientist, W. D. Miller. As the French say, *Il a parti sans addresse.*

We who are members of the dental profession today have one consolation at least, and that is, that the ranks are being filled up with young men, some of whom are college graduates, and all of whom have educational and social advantages which eminently qualify them to take up the unfinished investigations which others lay down and leave behind.

The experiments referred to have slept peacefully for over a quarter of a century. I have often thought, however, that they were entitled to further confirmation by continued experimentation. Recently, through the courtesy of Dr. J. Bethune Stein and the facilities afforded in the Histological Department of the New York College of Dentistry, I have been prompted to take up the subject once more, and to try and ascertain, if possible, if there be any regular arrangement or distribution of the calcium salts in the enamel, and whether any new light could be thrown upon that much-mooted question, *i.e.* is there any *uncalcified* tissue in the human enamel of the adult?

It would appear almost conclusive that

if a six per cent. solution of acetic acid dissolves the interprismatic substance under a microscopic lens without affecting the enamel rods, and if the same acid dissolves calcium carbonate in a test tube without chemically affecting the calcium phosphate under similar conditions, a regular arrangement of the calcium salts in the enamel should follow, *i.e.* the rods should be found to be composed of the calcium phosphate and the interprismatic substance of the calcium carbonate. But I regret that I have not had sufficient time to finish these experiments, the character of which, as you must see, is microscopical, chemical, and histological; much more time and study will be required to complete them. Some of the chemical tests, especially, are extremely fine.

I am obliged, therefore, to defer this part of the subject to some future time, and to change my course somewhat by digressing and touching upon other matters bearing upon the subject to some extent, which may prove interesting, if not instructive.

CORRESPONDING ACID RESULTS IN THE ORAL CAVITY.

Before digressing, I wish to say that from a weak solution of a vegetable acid in the laboratory, which destroys enamel structure, it is only one short step to the oral cavity, where an organic acid accomplishes the same thing, in both cases the objective point for attack being the weakest point in the structure, namely, the calcified tissue between the enamel rods. Obviously only two things remain to be done to remedy this condition of affairs: First, to work on the defensive, improving the nutritional state of the calcifying tissue during the period of tooth-formation, which should enhance the textural strength of the teeth and retard the activity of the bacterial causes of decay—in other words, to fortify the interior, and to render the position impregnable. In the second place, by assuming the offensive, outside the breastworks, we can exterminate the common enemy with some subtle poison.

It is a very easy thing to criticize and tear down, but it is much more difficult and praiseworthy to originate and build up. I admire the latter class of work, and have little respect for the former. But there are exceptions to all rules. In this case I have great respect for the micro-organisms that are continually "tearing down." They have proved the best friends the dentist ever had, or ever will have. These kind, invisible little creatures who have labored for us so silently and incessantly, through daylight and darkness, heat and cold, for so many years, deserve a slight tribute. To deprive them of the means of daily nutriment or to reduce them to a state of starvation would be a most reprehensible thing to do, for in turn it would deprive thousands of men and women of their means of support! Scientists may succeed in exterminating them, but if that day ever comes—and I pray that it never will!—then, as far as the dental profession is concerned, emulation will sleep, ambition will die, there will be starvation in the ranks, and the wailing and gnashing of teeth will resound throughout the world!

EXPERIMENTAL STUDIES RELATING TO BACTERIA.

Let me briefly call attention to a few other experiments that I became inter-

ested in a few years ago, which perhaps may at first appear to be outside the limits of the dental profession, for they mostly concern bacteriology and the medical practitioner. I refer to experiments relating to the inhibitory influence of oxygen upon the growth and development of the tubercle bacilli. Let me say just here that the application may be found in the different localities occupied by the different bacteria—those on the one hand which destroy lung tissue, and on the other those that destroy tooth-structure, both being apparently beyond the reach of medicinal agents.

The experiments which I refer to embrace four different series, the first in the laboratory of Kings College, London, under the supervision of Professor Crookshank, the second in the laboratory of the College of Physicians and Surgeons in New York city, under the supervision of Professor Prudden, the third in Loomis' laboratory, under the direction of the late Professor Loomis, and finally a series of experiments among the dispensary patients in the outdoor department of the Bellevue Hospital.

I will not weary you with the details of the technique employed in these experimental studies, suffice it to say that it was found that an excess of warm oxygen upon growing cultures of tubercle bacilli inhibits their growth and development. These studies, as I have observed, were continued in the dispensary, and a record of some sixty odd cases of patients afflicted with pulmonary tuberculosis was recorded. The hygienic condition of the patients was watched and improved as much as was possible, which I am free to confess, after my experience with dispensary practice, amounted to very little, at least in a majority of cases. Particular attention, however, was paid to the digestive tract during their course of systemic treatment, which was chiefly dietary, with the ingestion of one or more of the various preparations of iron, the object being to increase the number of red blood corpuscles and furnish more oxygen to the lung tissues. It was found that if the hemoglobin of the blood be increased even to a small degree and a corresponding increase be brought about in the percentage of red blood corpuscles, the patient becomes stronger, and that both subjective and objective symptoms are improved. I think it is the consensus of medical opinion today that any germicide that may be introduced into the human system which is powerful enough to kill the tubercle bacilli in the lungs will injure, if not destroy, the corpuscles of the blood; and by comparison it may be said that any germicide introduced into the oral cavity powerful enough to destroy the micro-organisms in the teeth will injure, if not destroy, the surrounding tissues.

You ask me, "Is there no hope, then, for consumptives?" No more hope, in my opinion, so far as medical agents are concerned, than there is of saving the human teeth by antiseptic tooth-washes.

While speaking on this subject, I should mention that the decrease in the death-rate in New York city* from pulmonary tuberculosis per 1000 inhabitants since 1881, has been from 4.2 to 2.21 (in 1904), a reduction of almost fifty per cent.

This low death-rate, however, is ascribed by the Department of Health to the general improvement of the sani-

* *Cf.* circular, "Information Regarding the Measures Adopted by the Board of Health for the Sanitary Supervision of Tuberculosis in the City of New York," 1905.

tary condition of the city, to the precautions that are widely observed by the consumptives, to the disinfection of the premises vacated by consumptives, and to the removal of "open" cases to hospitals. It is now the prevailing fashion for physicians to send their patients away to the country, and yet the increased knowledge relating to climatology has played but a small part in the compilation of the above statistics.

There is no doubt that a large majority of patients suffering from tuberculosis will live much longer, if they do not entirely recover, in a climate such as the Adirondack Mountains, the western coast of Florida, or in Southern California, than in climates such as we find in Boston, New York, or London.

But one thing must be borne in mind, namely, that when a beneficial climate is found, the patient must remain there, for a return to the climate in which the disease was contracted, at least without the advice of the attending physician, usually results in a relapse and a fatal ending.

Two important questions that will probably be discussed by the medical congress that meets in Washington next September will be the segregation of consumptives and the tuberculin test.

The point that I wish to emphasize, however, and which is likely to be of interest to the dentist in this connection, is, in my belief, that pathogenic micro-organisms after having once established a lodgment in the tissues are impregnable to any medicinal agent or antiseptic, and that when they are overcome and eradicated, such action is entirely due to the vital processes of resistance within the body, or to the self-limitation of the micro-organism, it having a limited medium in which to develop. Neither the lungs nor the teeth possess this limited condition.*

It would seem reasonable to conclude, therefore, that manual dexterity or skilful instrumentation, with good judgment in selecting proper filling materials, will do more for the salvation of teeth in the future—as has been the case in the past—by preventing the bacterial causes of decay, than an ocean of antiseptics, or an encyclopedia relating to the supposed germicidal or pathogenic influence of the saliva. When I review the wonderful improvements that have been made in dentistry during the past thirty years, my sense of pride wells up in thinking of the names of the mechanicians whose inventions have proved so useful and practicable; and when I recall the improved filling materials, the application of electricity, the ingenious and complicated mechanical devices in orthodontia, I feel inclined, for all practical uses, to cast my vote for the plodding constructive master-mechanic, in preference to the scientific and theoretical dentist.

DR. BLACK'S CONCLUSIONS.

Those of you who have followed Dr. Black in his scientific investigations relating to the "Physical Characteristics of the Human Teeth in Relation to Their Diseases," will recall that he says that the "differences in density or in percentage of lime salts in the teeth are not the controlling factors in the strength of the teeth, nor their hardness; this

* It has been claimed that carbolic acid dressings kill the tubercle bacilli in the tissues; others claim that leucocytes do so. It is admitted that quinin kills the germs of malaria, and that the continuation of the disease is due to reinfection.

seeming to depend upon the condition of the organic matrix. . . . The active cause of caries is a thing apart from the teeth themselves, acting upon them from without; and from a consideration of the facts thus far developed, the logical inference is that the cause of the differences in the liability of individuals to caries of the teeth is something in the constitution, operating through the oral fluids, and acting upon the active cause of caries, hindering or intensifying the effects.

"Imperfections of the teeth, such as pits, fissures, rough or uneven surfaces, any bad forms of interproximal contact, are all causes of caries only in the sense of giving opportunity for the action of the causes that induce caries. . . ."

"There is no basis," Dr. Black goes on to say, "for the treatment of pregnant women with a view of furnishing lime-salts to prevent the softening of their teeth, or with a view to producing better calcified teeth in their offspring.

"With our present knowledge, the only basis for the selection and adaptation of filling materials to classes of cases is the individual operator's judgment as to which he can so manipulate as to make the most perfect filling, considering the circumstances, his own skill, and the durability of the materials."

With some of these conclusions I am in perfect accord. In fact, the models of the cases which you have seen this evening bear upon and confirm at least two or three of Dr. Black's brilliant deductions.

But when any dentist who stands for reform and scientific methods affirms that "Caries of the teeth is not dependent upon any condition of the teeth, but upon conditions of their environment," or when it is said that "there is no basis for the supposition that some teeth are too soft or too poorly calcified to bear filling with gold, or with other metals in use for that purpose, since all are found to be abundantly strong," and that there is "no basis for the selection and adaptation of filling material to soft teeth, hard teeth, frail teeth (in structure), or poorly calcified teeth," I can only say that such a dictum is beyond my comprehension, and interferes with my conception of what is a reasonable conclusion after thirty-five years of observation and practical experience in the art of filling and preserving the human teeth. I have seen not only one case, but I think I can safely say that I have seen a hundred cases of "soft teeth" that have been filled with gold, which in a short time have decayed around the fillings; and I have seen the same thing occur in similar teeth which I have filled myself. I venture to say that there are living today hundreds of practical dentists who know practically nothing concerning the scientific causes of caries, but who have preserved thousands of teeth and who will bear me out in this statement.

I stand upon an empirical platform, in perfect accord with some of the scientific conclusions that are recorded, but equally opposed to others. From that much criticized platform I am prompted to ask my scientific friends how they account for the great vitality and pronounced immunity from caries in these two cases which are on exhibition? I have been informed by one dentist that it was "environment," or the absence of forces acting from without; by another that it was the "constitution," or the presence of protective forces acting from within; possibly it might be the latter, for none of us know what the aggregate

of the vital powers of a human being may be.

I have seen a poor woman upon her deathbed, apparently, weighing scarcely more than fifty pounds, with a pulse that was imperceptible and a flickering breath so feeble that hardly a particle of moisture could be observed upon a looking-glass; and yet two years after, I have seen the same woman doing a hard day's work, weighing one hundred and twenty pounds, with apparently every organ in her body sound. On the other hand, I have seen in the Rocky Mountains, 9000 feet above the level of the sea, a magnificent specimen of physical manhood attacked with mountain fever. I have watched that man grow weaker day by day, and weaker still; and all the tonics and stimulants and therapeutic agents in the state could not have saved his life.

Tell me, ye men of science, how do you account for this great difference in the vitality of two human beings? On the one hand we have the living skeleton who defies and conquers disease, on the other hand, the autocrat, the all-powerful, who succumbs at the first attack.

You aver that it is the presence of the phagocytes; you say it is constitution, heredity, vital force.

Let me say, gentlemen, that whatever that spark of life may be, or wherever it may be—*sabe Dios.*

Discussion.

Dr. I. N. Broomell, Philadelphia. I am very glad indeed to take some part in the discussion of this paper, especially because I do not agree with all the features which the paper contains.

I do not agree with the essayist when he says that he is inclined to be empirical, because I believe that he has felt that this term applies to him because of his disposition to talk common sense, which he may feel is antagonistic to scientific speculation and scientific facts.

Science and common sense are not usually placed in the same class, but after all there is but little difference between them. I have little faith in any scientific principle which does not have some practical application, which most of them have.

Can it be possible that the scientific knowledge which most of us possess in regard to the evolution and growth of the teeth has no practical application? Can it be truthfully said that an understanding of the histologic characteristics of the hard dental tissues is of no practical value? Now, we have this knowledge, but do not make practical use of it.

I never hear the treatment of pyorrhea alveolaris discussed without feeling pity for the delicate fibrous elements which are torn asunder through instrumentation, and am convinced that if the knowledge which we have regarding the histology of these parts were more practically applied the result would be very different.

The essayist exhibits photographs of two complete sets of teeth which he says "differ in appearance and apparently in structure," and the question seems to arise whether there is any marked difference in the structure of human teeth? Here again common sense coupled with scientific knowledge supplies the answer, *i.e.* that there is a difference. We might just as well make the claim that all other similar tissues of the body are chemically identical. Take, for example, some other epithelial product, say the hair, in which there is a great variety in texture. Is not this the result

of a variation in its chemical constituents?

Take the nails, the hardness of which varies in different individuals, and at different periods in the same individual. Is it not right to say that this is the result of a variation in the chemical constituents of the nails? No one will deny this, yet there are men who claim that the teeth, although just as intimately connected with the body as the hair and nails, and developed and nourished very much in the same way, do not vary in the same way, that is, do not vary in hardness.

I believe this to be incorrect. On the contrary I believe that not only do the teeth of different individuals vary in their proportionate chemical constituents, resulting in harder or softer structure, but also that this same variation exists in the teeth of the same individual at different periods.

I cannot agree with the essayist when he asserts that the abrasion present in case No. II is the result of "soft teeth." While these teeth may be softer than those in case No. I, these deductions cannot be positively drawn, from the fact that their occlusal surfaces are abraded. On the other hand, experience seems to teach that teeth thus abraded are usually hard in texture and on this account frequently immune from caries, as is shown in the case exhibited.

There being no further business before it, Section II adjourned *sine die*.

SECTION III:

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

Chairman—D. J. McMillen, Kansas City, Mo.
Secretary—F. E. Cobb, Minneapolis, Minn.

FIRST DAY—Wednesday, July 29th.

The first meeting of Section III was called to order by the chairman, Dr. D. J. McMillen, Kansas City, Mo., at 3 P.M., Wednesday, July 29, 1908.

The first order of business was the reading of a paper by Dr. A. H. Merritt, New York, N. Y., entitled "The Protective Substances of the Blood in Their Relation to Pyorrhea Alveolaris," as follows:

The Protective Substances of the Blood in Their Relation to Pyorrhea Alveolaris.

By ARTHUR H. MERRITT.

In the study of disease phenomena, especially those in which bacteria are an etiologic or complicating factor, it is of prime importance, in the formulation of therapeutic measures for their relief, to inquire into the means of defense provided by Nature, in order to ascertain if we may not, through co-operation with her in combating such disease, enlist in our service forces more potent than any which might be employed were we to disregard them; for it will always be found true that the measure of our success will be just in

proportion as we are successful in interpreting her methods and as we direct our treatment toward supplementing and enforcing them.

Such a study necessarily involves a consideration of many of the fundamental problems of pathology.

Experimental bacteriology has added so much to our knowledge of inflammatory processes as to materially change the viewpoint of a decade ago. We can no longer regard inflammation as a destructive process. It may be, and usually is, a danger signal, but by no means necessarily a danger. In whatever way it expresses itself it must be regarded as being a salutary process, and this notwithstanding the fact that it may not always be successful in accomplishing the desired results. In line with this conception of inflammation is the definition of Adami,* in which he describes it as "the series of changes constituting the local manifestation of the attempt at repair of actual or referred injury to a part, or, briefly, as the local attempt at repair of actual or referred injury." It is of the utmost importance, therefore, that we keep clearly in mind the fact that inflammation is a physiological process, physiological in so far as it is the calling into action of properties normally possessed by the tissue involved.

It is also essential to its clear understanding that the multifariousness of the process be not overlooked. It is not to the leucocytes alone, or to vascular changes, or to altered temperature, or to reaction on the part of the fixed cells of the part, that we are indebted for repair within the affected tissue. Every agency at Nature's command is employed against the irritant. "The cells of the body, fixed and free, play their part; the nervous system aids the process; the bodily humors render efficient help; modification in the vessel walls and blood stream are valuable auxiliaries. Diverse processes are employed, now one more particularly, now another, according to the needs of the moment, but none exclusively,"* all directed toward the one end, *i.e.* healing within the affected area.

Given the presence of pyogenic bacteria within a tissue, certain well-known phenomena will be noted, such as the slowing of the blood current within the affected zone, a dilatation of the capillaries and veins, a crowding of the corpuscles along the walls of the vessels and their migration into the surrounding tissue spaces—an act not confined to the leucocytes, but one which includes large numbers of the red cells, though this action on their part is purely passive, due to changes in the blood pressure and to lack of continuity of the capillary walls. This outpouring of the cellular elements is accompanied by a fluid exudate resembling in chemical composition the blood plasma, and which varies according to the affected tissue, the nature of the infecting organism, and the reactive ability of the infected individual. This exudate possesses of itself bactericidal power sufficient to make it inimical to certain forms of germ life, though it is probable that it exercises little if any restraining influence upon pyogenic organisms. It also has a diluent action upon bacteria, limiting their power by washing their toxic products out of the lymph circulation.

If careful observation be made of the migrating leucocytes it will be noted that

* "Inflammation," p. 228.

* *Ibid.*

they are definitely moving toward the seat of infection—that the invading bacteria have for them a peculiar attraction, one which has been characterized as positive chemiotaxis. It is this same stimulus, having its origin within the area of irritation, which reacts upon the vessel walls, especially upon the endothelial cells lining the capillaries, bringing about changes which facilitate the emigration of the leucocytes. This action on the part of the leucocytes, as described by Metchnikoff, is for the purpose of destroying the bacteria, a belief which has come to be generally shared by all pathologists, it being accepted that the phagocytic activity of the leucocyte constitutes its most important function.

The researches of recent years have shown that the invasion of the infected zone by leucocytes does not necessarily mean phagocytosis. Other conditions are essential to the performance of this function. The bacteria must themselves be acted upon before they can be taken up by the leucocytes. An examination of the blood plasma reveals the presence of a large group of bodies known as agglutinins, which possess the power of agglutinating or holding together in clusters the bacteria, in this way facilitating the phagocytic activity of the leucocytes and exercising a salutary influence in limiting the spread of infection. But more than all else, and absolutely essential to phagocytosis, is required the presence of still another group of substances found in the blood plasma in greater or smaller quantities, and one which is all-important in pyogenic infection. To these substances Sir A. E. Wright, who with Leishman was the first to study them, gave the name of opsonins. Their exact nature and just how they influence phagocytosis, other than that they in some way prepare the bacteria for ingestion, is unknown, but that the persistence of many types of chronic purulent inflammation is due to a deficiency of these bodies there would seem no longer to be any doubt.

These in brief are the instruments with which Nature fights infection. The question which naturally arises is: Why is it that she is not always successful? It is a common observation that pus processes tend to become chronic, that one boil is followed by another, etc. We know that it is not due to a deficiency of leucocytes, for the formation of pus anywhere in the body, if of any extent, is immediately attended by an increase of the white cells. We know also that the phenomena which attend inflammatory processes are not wanting, such as increased blood supply, extravasation of leucocytes, etc. The researches of Wright have thrown much needed light on this point, showing that it is not to these things that we are to look for the breaking down of Nature's protective forces, but to an insufficiency of opsonins in the circulating media. It is his belief, now accepted by many others, that it is this factor which is responsible for many types of chronic pus infection, and that in many instances these may be cured by raising the opsonic standard; that is, by stimulating the production of opsonins by means of the inoculation of bacterial vaccines.

If we now turn to the antiseptic method employed in combating bacterial infections, we cannot fail to be impressed with its limitations, in whatever light we consider it. The internal administration of antiseptics for the purpose of inhibiting or extinguishing microbial growth

within the organism is by common consent acknowledged to be of no avail, unless we accept the belief now entertained by some observers, that we owe the curative effect of quinin in malaria and mercury in syphilis to their germicidal action, and make an exception in these diseases.

Significant also is the fact that they have been largely abandoned in the treatment of ordinary surgical wounds. In their local application, in the words of Wright, "It is axiomatic that antiseptics can take effect only on those bacteria with which they come in contact. It is obvious also that in the case of the skin and mucous membranes the infecting bacteria will not all lie on the surface, and that they will not, even though lying on the surface, be limited, with respect to their distribution, to those regions which are accessible to antiseptics. It follows, therefore, that it will be unreasonable to expect from any application of antiseptics anything in the nature of complete sterilization; in every case there will remain a residue of surviving bacteria, and the survivors will inevitably multiply and reoccupy the disinfected surface. And this is not all. The antiseptic will not, as the unthoughtful assume, add its anti-bacterial power to the anti-bacterial power of the living organism, but on the contrary will directly antagonize the protective forces which the living organism has at command; it will paralyze the phagocytes and abolish the anti-bacterial power of the blood fluids. By the action of the antiseptic the disinfected surface will thus be left swept and garnished for reoccupation by the expropriated bacteria. And again this is not all. The antiseptic application will also injure the histologic elements, and in particular the capillaries of the tissues to which it is applied."* They also injure the cells of the tissue, seriously interfering with their reactive forces. These factors are too often overlooked in the application of antiseptics in dental practice.

Is it strange, then, that all the more thoughtful workers in this field should direct their attention toward the protective forces with which the living organism is equipped, with a view to ascertaining if they may not, by its scientific exploitation, summon to their aid agencies more efficient in fighting bacterial infection than any which have hitherto prevailed?

In the study of pyorrhea alveolaris one is brought face to face with what is perhaps the most typically chronic pus infection to be met with in the human body, a disease which is responsible for the loss of more teeth than all other known causes, and one which is directly or indirectly responsible for many systemic disorders of a grave nature. An attempt will not be made at this time to discuss the etiology of pyorrhea. It is sufficient for the purpose of the moment to call attention to the fact that all writers on the subject are agreed in this, that the micro-organisms of the human mouth are in every instance a complicating and perpetuating factor in the progress of this disease, and while some are inclined to give them first place as causative agents, all seem willing to accord them second. Whatever may be their influence, there is little doubt that if the rôle played by them could be controlled, a great advance would thereby be made toward its successful treatment. The question which naturally suggests itself in this connection is: Why is it

* "Principles of Opsonotherapy," *Journal A. M. A.*, August 10, 1907.

that Nature's defensive machinery offers a no more effective resistance to the progress of this disease? McKenzie* has answered it by saying that in pyorrheal infections phagocytosis is invariably absent, and that this is accounted for by a deficiency of opsonins in the fluid exudate, which condition not only predisposes but invites chronicity. Other investigators—and notably Goadby†—claim that bacteria are frequently present in the leucocytes of pyorrheal pus. From these and other observations one thing would seem reasonably certain—that in many cases of pyorrhea, phagocytosis is at best but an indifferent process; that the micro-organisms, meeting as they do with little or no active resistance, may be regarded as the chief obstacle to success in the treatment of this disease. In a series of studies along this line undertaken by Goadby‡, some very interesting facts have been revealed. The cases selected by him were those of undoubted pyorrheal infection. Several presented more or less marked constitutional symptoms, such as anemia, neurasthenia, and gastro-intestinal diseases. There were also several in which there was a fairly marked leucocytosis. The bacteriological investigations, while confirming the mixed nature, showed that bacteria belonging to the staphylococcal group were the most constant in their presence. It was this group which was tested against the patient's serum in determining the opsonic index. In any given case this is accomplished thus:

First, a sufficient quantity of the patient's blood serum is obtained, together with that of a normal person. This is done by a puncture of the finger-tip, or the lobe of the ear, and the blood is drawn into a glass pipette of small diameter, the ends are then sealed and the clot is allowed to form and separate. A few drops only are required.

Second, white blood-cells are obtained which have been thoroughly freed from the plasma in which they normally float. It is a matter of indifference whence the blood for this purpose is obtained, provided only that it is not from a person suffering from diseases of the lymphatic system. The blood so obtained is, after dilution with a solution of sodium citrate to prevent coagulation, transferred to a centrifuge tube and thoroughly centrifugalized. By this method the leucocytes are separated from the red cells and blood fluids, and made ready for use.

Third, an emulsion of the bacterium is secured toward which the opsonic index of the patient is to be determined. This emulsion, with few exceptions, should be freshly prepared. The infecting organism having been obtained, a culture is made on an appropriate medium, from which the emulsion is prepared. The leucocytes, emulsion, and patient's serum are then brought together in definite proportions, and after thorough mixing are sealed in glass tubes and kept at blood temperature for about fifteen minutes. Films are then prepared for microscopic examination and the number of bacteria contained in each leucocyte noted until 100 such leucocytes have been counted. This is also done with the emulsion made from the normal serum. This having been accomplished, the number of bacteria found in 100 cells of the patient's slide is divided by the number found in 100 cells of the normal slide—the result shows their respective indices.* The

* J. J. McKenzie, *Dominion Dental Journal*, May 1907.

† *Lancet*, March 9, 1907, p. 633.

‡ *Ibid.*

* Allen, "Opsonic Method of Treatment."

normal opsonic index is placed at 1, from which there is little deviation in health. This is a purely arbitrary standard.

The opsonic index having been taken, a vaccine of the same nature as the infecting organism is prepared. As a rule, the best results are obtained when organisms from the patient's own lesion are employed. This vaccine consists of an emulsion of bacteria in nutrient broth or salt solution, in which all the organisms have been killed, usually by heat. The inoculum will vary in amount from 0.05 to 1.0 ccm. The number of dead bacteria injected will depend upon the opsonic index and the nature of the infecting organism.

Thus in gonococcal infections the initial dose would be about 50,000,000, while 250,000,000 to 500,000,000 would be the numbers employed in staphylococcal infections. The inoculation is usually attended by a lowering of the index, and not infrequently an exaggeration of the symptoms attending the disease. This may be slight, lasting only a few hours, or it may extend over several days; it is known as the negative phase. If the dose has been properly estimated this will be followed by a rise in the index which will probably carry it several points above normal, where it will remain, with slight variation, for several days or weeks. This is spoken of as the positive phase.

These inoculations are repeated with sufficient frequency to maintain an increased opsonic index during the period of treatment. The result is an increase in phagocytic activity, dependent upon an increase in the opsonic power of the blood fluids, and is usually attended with marked improvement in the disease. By this method a degree of immunity against the infecting organism is secured. Now, immunity may be and frequently is brought about in certain infectious diseases through auto-inoculation, bacteria in sufficient numbers finding their way into the blood stream and thereby increasing its bactericidal power and conferring a degree of immunity the duration of which is dependent upon the nature of the infecting organism and the reactive ability of the patient. This is notably true of such diseases as tuberculosis and gonorrhea. It is this factor which is being taken advantage of in England* in the treatment of pulmonary tuberculosis with most excellent results, where through the instrumentality of carefully graduated labor, auto-inoculations are artificially induced, immunization against the infecting organism being thus secured.

Of the thirty-six cases examined by Goadby, twenty-nine were found to possess an opsonic index subnormal in varying degrees. In the treatment of these cases with bacterial vaccines, he found that after the preliminary negative phase —which was attended by symptoms of an exceedingly mild nature, disappearing within twenty-four to forty-eight hours—improvement in the general symptoms was manifest and invariably preceded local improvement. Local treatment, such as curettage, removal of calculi, etc., was instituted in each case, with the result that in two cases in which the question was directly tested the healing of the local parts in the immunized patient was four times as rapid as in the same patient before immunization. In a large proportion of those treated by him, in which the teeth were not all affected to the same extent—and this is true of most

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* *Lancet*, January 25, 1908.

cases presenting for treatment—he found the employment of bacterial vaccines particularly satisfactory. The following quotation may be said to fairly represent his conclusions: "Local applications, curetting, electrolysis, and many other methods have been recommended for treating the local disease, all of them being directed toward removal of local agglomerations of bacteria, calculi, and débris, and the enjoinment of constant care on the part of the patient after such treatment has cut short the disease in the earlier and much ameliorated it in the later stages; but as long as lowered resistance to the infective organism remains so does the disease progress. These facts, and the consideration of the bacteriology of the disease, point to the urgent want of some method by which the general, as well as the local, infection may be attacked."

Similarly good results are reported by Carmalt-Jones, Humphreys, and Wright.*

If we now briefly consider the local conditions as they prevail in pyorrhea, we find other reasons which may aid in explaining the ineffectiveness of Nature's protective forces in their relation to this disease. With the advent of inflammatory changes in the pericemental tissues, there is coincidently an involvement of the bloodvessels, which as the disease progresses results in their more or less complete obliteration, a condition which is not confined to the pericemental membrane, but one which gradually extends itself to the alveolar process. Inevitably there follows a diminution in the blood supply, with corresponding diminution in the exudate as it is poured into the infected zone, which decrease means a deficiency in the bacteriotropic substances at the seat of infection.

Another possible cause may be the calcium salts present in the deposits upon the roots of teeth affected with pyorrhea. We know that calcium salts are essential to the coagulation of the blood. We know also that in certain infections a high calcium content of the blood stream, because of its coagulating effect, so interferes with the fluid exudate as it is poured from the vessels that it exercises little if any restraining influence upon the infecting organism. Just what would be its influence under conditions such as exist in pyorrheal pockets would be difficult to say, but it is not altogether unreasonable to suspect that in certain cases it exercises a restraining influence upon the free flow of the fluid exudate within the infected area, in this way interfering with the phagocytic activity of the leucocytes. Still another factor is that which is more or less common to all foci of bacterial infection, viz, a deficiency of anti-bacterial substances within such foci, due to their absorption by the organisms, a phenomenon which always takes place whenever blood fluids are brought into contact with bacteria. It would seem probable, therefore, that whatever may be the success attendant upon local treatment, such as curettage, the employment of counter-irritants, antiseptics, massage, etc., it is largely obtained because such treatment has been instrumental in the determination of an increased blood supply to the parts, because in such treatment—no doubt unconsciously in many instances—there has been in some small measure an augmentation of Nature's reactive forces. Just what place opsonotherapy will take in the treatment of this disease is a question

* *Lancet*, December 28, 1907, p. 1818; *Journal A. M. A.*, August 17, 1907, p. 572.

which cannot at this time be answered. Our present incomplete knowledge of Nature's reactive forces in bacterial infections, the elaborate technique involved in determining the opsonic index—requiring the co-operation of one skilled in laboratory work—and the difficulty of maintaining a high standard for any considerable length of time, very much limit if they do not altogether prohibit its general employment.

But whatever may be the therapeutic method employed, whether it be Bier's method of induced hyperemia, or that of Mikulicz, viz, of injections to increase the resistance period, or the employment of bacterial vaccines as indicated by Wright, it is essential that it be based on the assumption that inflammation is first, last, and all the time a local reaction to injury, and that successful treatment must therefore be directed toward stimulating and augmenting those reactive forces.

In conclusion, it is sufficient to call attention to the fact that in the protective substances of the blood we have a most efficient instrument for the treatment of purulent inflammatory processes, needing only to be intelligently directed to that end; that in consequence of the impairment of such substances we find the circulatory system to be the chief factor in the chronic and progressive nature of pyorrhea alveolaris, permitting the ever-increasing and multiplying activities of the micro-organisms that are omnipresent in these cases; that whatever may be the influence of diathetic or other constitutional vices, they express themselves in every instance through the circulatory system; that our present antiseptic methods, while a great advance over those which prevailed prior to their introduction, must be conceded to be a crude, and in many cases, a wholly inadequate instrument with which to fight bacterial infection; that, whatever the therapeutic measures employed, their success will be found in every instance to be proportioned to the accuracy with which they interpret and conserve the reactive forces of Nature.

Discussion.

Wm. R. Williams, M.D., New York, N. Y. Dr. Merritt's paper has interested me greatly. It shows a concern for the recent scientific work in medicine and a discontent with the present limitations of our treatment that are very stimulating. I do not quite know at what point to take up the discussion. What he said was so well thought out and so accurately expresses the results of the latest work along these lines that I would not challenge or criticize his words. Perhaps, however, some of you, busy with work in your own special field of healing, have not found much leisure to devote to the literature of other departments of medicine, and therefore you might be interested to hear more of what is being done in connection with treatment by means of vaccines.

Vaccination for the prevention of infection has been used successfully in the case of several important diseases, notably bubonic plague, cholera, typhoid fever, and most important of all, smallpox, the disease in which it won its first and greatest triumph. Dr. Merritt, however, speaks of quite another phase of the subject, namely, of the use of vaccines for the purpose of effecting a cure in persons who are already the victims of an infection. This use of vaccines has been studied carefully during recent years only, and is yet largely undeveloped.

While the existence of such substances as opsonins is generally admitted, there is some skepticism among bacteriologists as to the reliability and value of Wright's methods of measuring the opsonic power of the body fluids. The method is rather complicated and tedious, and requires an exquisite technique. These difficulties, of course, militate strongly against the adoption of this guide to the use of vaccines. Whatever the final valuation of Wright's hypotheses and methods may be, we are forced to admit that he and his pupils in working with these methods have obtained results in the treatment of certain conditions of disease that have surpassed the results of all of their predecessors.

The treatment with vaccines does not seem equally applicable to all types of infection. It gives promise of the greatest success against those lesions that are rather sharply limited to small and somewhat discrete portions of the body. In its relation to these diseases the human body is very like the body politic in its attitude to foci of political disease and corruption. As an example of this one may cite the conditions of government that exist in so many of our cities. We know that these evils exist and we realize that they are undesirable, but we get along tolerably well in spite of them, and therefore put up with them and pay the cost of it all with complaisance. If all of the units of the political body could but be aroused to activity, and a concerted attack be made upon the disease, it could easily be overcome and eradicated. Thus it is with our physical bodies also. Bacteria may lodge and thrive here and there, and may cause a certain amount of damage to the organism, but without stirring up its protective forces to an adequate degree. In consequence of this lethargy the invading organism persists in its noxious activities, and the host sacrifices more or less of its tissues to the slow advances of the disease. There are, however, forces dormant in the cells of the body that are able to overwhelm and exterminate the parasitic invader and to restore health to the organism. To awaken these latent functions intelligently and effectively is the aim of vaccine therapy.

A familiar instance of such a segregated disease is the group of suppurative infections of the skin due to the pyogenic staphylococci. Furunculosis and the ordinary acne are members of this group. You know how boils may crop out, one after another, for a period of many weeks, and how the acne pustules continue to recur in certain persons for years. Heretofore all sorts of disturbances have been blamed for this condition, and physicians, unable to achieve brilliant success in the treatment of the acne itself, have accused their patients of being constipated or of having indigestion, uterine disease, anemia, or general debility. If the patient could successfully vindicate himself from all of these charges, the physician could only fall back to that impregnable fortress, diathesis, and say, "Well, you have an oily skin." For treatment there were many indications, and yet it was always necessary to add a word of caution to the effect that acne was a stubborn and refractory condition. I would not belittle the advantages of correcting such errors of health as those mentioned, nor would I deny that constitutional disturbances influence localized infections not obviously connected with them, but we should not let these associations blind us to more immediate factors.

Acne was one of the first infections

treated extensively by Wright. He deliberately omitted all other treatment, and prepared vaccines of the infecting organism. By injecting suitable doses of this vaccine at intervals of a few days he succeeded in promptly curing a large majority of his patients. This had not previously been accomplished. Boils and carbuncles also usually yield readily to the vaccine. The treatment has also been tried for many other conditions, and often with brilliant results. The list includes certain localized forms of tuberculosis, gonorrheal joints, some inflammations of the bladder and large intestine, and many other diseases.

Pyorrhea alveolaris would seem to be an infection particularly suitable for vaccines. It is localized and chronic, and suggests a peculiar vulnerability of a special tissue in the individual attacked. The difficulty in the treatment seems to lie in picking out the causative bacteria from the motley flora of the mouth. Perhaps Wright's method of estimating the opsonic index will prove adequate to this task. It is probable that only a very few species of micro-organisms will be found to be causative. When they have been more definitely studied, it should be relatively easy to determine the offending organism in any given case by cultures from the patient's gums. Progress in this direction has already been made, and not a few instances of very successful treatment of pyorrhea by means of vaccines have been recorded. Sometimes a vaccine composed of a single kind of bacterium has been sufficient for a cure, in other cases two or more species have been needed.

The injection of the vaccine and the local effect at the site of the puncture are not particularly annoying, and patients soon forget them as they appreciate the improvement in the condition of the mouth. While we cannot yet say that the vaccine treatment of pyorrhea is fully developed, the results have been so favorable that moderate display of enthusiasm for it is justified. In the near future it should be tried carefully and conservatively in a large number of cases, and the results should be submitted to your profession for its judgment. It is not too much to expect that when this shall have been done, the vaccine treatment of pyorrhea will outgrow the stage of experiment and will be recognized as a valuable addition to our armamentarium.

In conclusion, I wish to thank you for the privilege of sharing with you in the discussion of Dr. Merritt's timely paper, and to express my hope that the reciprocal interchange of ideas between students of the two great branches of the art of medicine to which you and I respectively own allegiance may become general, that we may the better work together and with our combined knowledge attack more successfully our lifelong enemy—disease.

Dr. Herbert L. Wheeler, New York, N. Y. A complete discussion of this paper would require so much time and space that I shall only attempt to touch the subject here and there. In order to understand the working of those fundamental powers in nature that warrant defense against disease and infection of all kinds, it is necessary to appreciate how nature, by a power of selection, has preserved those individuals who have most readily developed those qualities that result in self-preservation, and has eliminated those members of the species who have failed to develop such qualities as would preserve them from the attacks of disease.

With an understanding of this condition, it will be seen that the valuable and intelligent paper we have just listened to is an attempt to describe the *modus operandi* that nature has developed in order to preserve the living organism from injurious attack by pathogenic bacteria. Constant successful attempts on the part of nature to bring about immunity from bacterial attacks are seen in cases where infectious diseases like scarlet fever, measles, chickenpox, etc., make the individual immune from further attacks from the same disease. That is, through some power produced by the disease, the individual has acquired immunity against this infection.

Some species of animals have what is called natural immunity, *i.e.* these animals are not susceptible to certain diseases, and again we observe that some diseases run in families, for instance, carcinoma, gout, insanity, and tuberculosis. This seems to show that there may be inherited susceptibility or inherited immunity. Again, a given individual varies greatly in his powers of resistance at different times and under different conditions. I speak of this because what is true of an individual is true of the cells or tissues of any organs of an individual, and you will see that this has a bearing upon the disease which we are discussing.

You will remember that there are various ways of obtaining immunity from the attacks of disease. I have spoken of natural, acquired, and family or inherited immunity. The paper is dealing with what may be called anti-bacterial or antitoxic immunity, for it is practically concerned with the protective substances of the blood stimulated to their protective activity by the action of attenuated bacteria, and in this particular case the immunity to be secured is protection against the disease of pyorrhea alveolaris.

At this very point a troublesome question presents itself to me, which I am sure will also trouble the essayist. Is pyorrhea alveolaris a bacterial or infectious disease? As far as I know, no one has successfully demonstrated the specific bacillus of this disease. Goadby in his treatment used a mixed serum infected with several of the staphylococci group, which is made up of the several varieties of the pus germs that are found normally upon the skin surfaces of all individuals, and also upon the mucous membranes; these bacilli but seldom enter the tissue or make trouble except through lesions in the surface of the mucous membrane or the skin, so that the evidence so far seems to indicate that if pyorrhea is an infection, its chief causes are the staphylococci and streptococci, and unless there is some means of entering the abnormal tissues for these bacilli there is seldom infection from them. Under these circumstances, can we, with our present knowledge of the subject, conclude that the primary cause of the disease must necessarily be a bacterial infection?

This, in my opinion, is not proved, for no bacteria found so far will meet the demands of Koch's law—*i.e.* to produce the disease by the alleged specific germ —and while there doubtless is a germ infection in all true cases of pyorrhea, the evidence, I believe, will show that there is a previous disease of the tissues at the gingival margins of the gums. This primary disease of the gingival tissues may be excited by either local or constitutional causes. The prevailing opinion at the present time favors belief in

a constitutional cause of metabolic origin, though local causes undoubtedly play a part.

If this is the case, we would not think of securing immunity by antitoxic or anti-bacterial serums any more than we would in Bright's disease or arteriosclerosis. This does not necessarily invalidate the contention that benefit is derived from Goadby's treatment of using a mixture of staphylococci, for the general tone and resistance of the whole system against staphylococci and streptococci might have been considerably raised toward a point where immunity might be present, very greatly improving the pyorrheal condition, and yet the primary cause might be untouched, and a recurrence of the disease might occur as readily as before the serum treatment.

While this suggestion of serum therapy is very attractive and offers alluring temptations to resort to it, I wish to call attention to the complex operations required in the application of this kind of treatment, and to the grave injury that might arise from an infection of the patient if the treatment is not carefully and scientifically carried out. It is doubtful if the education of the dentist fits him to attempt this work.

The description of the opsonic bodies given by the essayist is not perfectly clear, and the quality of agglutination may as readily be produced by the so-called cast-off receptors of the "side-chain" theory of Ehrlich, as by the so-called opsonins of Wright and Douglas. Thus far the chief function of the opsonic bodies seems to be the stimulation of phagocytosis. The opsonic theory seems to agree with that which observation indicates, namely, that phagocytosis of microorganisms by the leucocytes is impossible without the aid of some such property in the serum. It seems that Wright and Douglas consider that the opsonins act directly on the bacteria; as to whether these substances stimulate phagocytosis does not seem to be definitely settled. It is believed that the opsonic or bacteriotropic substances act, although the action of bactericidal serums has yet to be definitely established. It is also common knowledge that bactericidal serums have not been very successful as curative agents, and at present the outlook is not very encouraging.

Experiments upon animals indicate that the serums are much more useful as prophylactic measures than as curative agents, the immunity conferred being of short duration, the anti-bodies being destroyed within two or three weeks. Under these circumstances it would seem that there is much opportunity for further investigation along these lines before any very definite knowledge can be claimed.

The statement that antiseptics can take effect only on those bacteria with which they come in direct contact should be taken as a warning against the indiscriminate use of antiseptics in the oral cavity, and especially against proprietary remedies of unknown composition, for it is evident that in many instances the use of antiseptics in the mouth will prevent the fluids usually found there from performing their function of protecting the various oral tissues from the attacks of infectious disease.

The term pyorrhea alveolaris is such an elastic one that it is often very hard to understand the true condition of a case from the description published, which is confusing; but while the primary exciting causes of this disease may vary widely, it would seem that the essayist has spoken truly when he says

"We find the circulatory system to be the chief factor in the chronic and progressive nature of pyorrhea alveolaris."

I believe this to be *always* the case, and in most instances, if the original exciting cause can be found and eliminated, the progress of the disease can be stopped, and unless this first cause be found and removed, any and all other treatments are only palliative. I also believe that until the members of our profession are so well trained in a knowledge of what constitutes a normal condition of living tissues and a pathological one that they are able to discriminate between the great variety of first causes which may obtain in this disease, we will not make any great progress in curing pyorrhea alveolaris.

The last words of the essay are worthy of being forever retained in our memory: "Whatever may be the therapeutic measures employed, their success will be found, in every instance, to be proportioned to the accuracy with which they interpret and conserve the forces of Nature."

I congratulate the essayist on his evident appreciation of the complex situation that may obtain in the disease which he has so ably discussed.

Dr. G. R. Warner, Grand Junction, Colo. A writer makes many sacrifices and exhibits much courage if he works in the fields of physiology, pathology, and bacteriology. The essayist has not only made sacrifices and shown courage, but has given to this association freely of the product of many hours of reading, many hours of thought, many hours of hard work. The product is good. The result is worthy of the writer, and the literature of dentistry is enriched by the essay just read.

The essayist's remarks on antiseptics are especially valuable, combating the popular and erroneous ideas in regard to this subject. He calmly, sanely, and logically treats of the use of antiseptics in pyorrhea and their practical everyday application.

I had the pleasure of hearing a paper read by Dr. Gerald B. Webb at Colorado Springs, Colo., in June 1907, on "The Opsonic Treatment in Pyorrhea Alveolaris." Dr. Webb had shortly before returned from the laboratories of Wright and Douglas in London, and had done considerable work in the opsonic treatment.

Dr. Webb reported the treatment of one case of pyorrhea, with an entire cessation of the formation of pus without the aid of any local treatment. The organism in this case was the staphylococcus albus. Mr. Goadby of England, in an examination of ninety cases, could find no one organism with sufficient regularity to establish it as the causative factor in pyorrhea alveolaris, although the staphylococcus occurred in many of the cases.

Others have treated pyorrhea by the opsonic method with more or less success. How permanent the results have been I do not know.

But as the essayist says, the technique of the opsonic treatment is rather too complicated at the present time for general use in the treatment of pyorrhea. The subject-matter of the essay is, however, none the less valuable, and should set investigators to work. It should incite them to carry on the work of Wright and Douglas, to supplement the experiments of Goadby. It should produce practical results in the way of greater knowledge of the bacteria of this disease and better understanding of the protective substances of the blood, and a

rational application of that knowledge to the treatment of those cases of pyorrhea which, under the present conditions, are the bane of the average dental practitioner's life. I think that the specialist in this work would not refuse assistance from even so humble a source as the opsonins of the blood.

All this means hard, persistent work. It means the work of trained minds with all the necessary aids at hand. It cannot be done by the busy practitioner, but requires the entire attention of experienced investigators.

Where is our profession going to look for these men and this equipment? There is only one place to look—that is within. What is to be done we shall have to do ourselves, and I believe that this National Dental Association is the proper body to inaugurate this work in the broad manner necessary, or rather that it is the proper body to carry this work to its final perfection, for the subject has already been taken up by some local societies. When this has been done, the questions so well discussed in this paper, and others of equal importance, can be carried to their ultimate conclusion.

Then, and then only, will our profession rise to the heights which it is destined to reach.

Dr. James E. Power, Providence, R. I. In the consideration of the subject which has been so ably presented by Dr. Merritt today, we find that science not only discovers newer manifestations —or rather, newer interpretations of old manifestations—but it also reclaims many manifestations which had been formerly discovered. The fever temperature of the body, for instance, was never regarded and treated as though it were aiding in the devitalization process. We find now that many observers are convinced that it assists in destroying the process of infection, by the changes it produces in the blood and tissues. We also find almost a revolution in the conception of the pathology of inflammation.

It is now a well-recognized fact among students of disease and its causes that antiseptics have not done all that was expected of them, nor have we accomplished by their use all that we thought we were accomplishing.

Investigators have proved beyond any reasonable doubt that the tissues have the power of resisting the action of micro-organisms, and also that when antiseptics are applied for the purpose of destroying bacteria, they not only inhibit or destroy the action of bacteria lying upon the surface, but that they also destroy the natural resistive forces of the tissues. Does this explain why so many surgical operations, such as amputations, incisions in abscesses, and even major operations performed under seemingly crude methods, resulted in favorable recoveries? Does this also help to explain why surgical operations in the oral cavity, even if in an uncleanly condition, result in favorable recoveries?

It seems that in regard to the treatment of certain diseases, and especially of the one which we are considering today, we have been waging war against the micro-organic army without giving the proper amount of attention to those factors which may have enabled it to remain defiant all these years.

We are conscious, indeed, of the fact that a great deal has been accomplished, but much more will be accomplished in the future, because dentists are slowly but surely studying those factors which have in the past prevented us from ac-

complishing our ends in fighting disease. Possibly we have been using too much time in perfecting ourselves along the mechanical lines of our calling, but the time is now here when in order to intelligently treat such diseases as the one under discussion, we must direct our attention toward the blood and the tissues which render these diseases possible. Nor can we be satisfied with a detailed study of bacteriology. We must make a detailed study of biology as well as physiology, anatomy, and pathology. Nature does much to repair her injuries, and she is not satisfied with restoring the injured part to its original condition, but she seems to reinforce that part, as if to insure it against further injuries, as, for instance, in the formation of a scar after the union of broken soft tissues, or in the formation of callus following the repair of a fractured bone, etc. Even in view of all these statements, which are based on facts, it is our duty to improve upon Nature, and to regard her efforts at self-repair simply as valuable hints of what she is trying to do. We must remember that we can and do improve Nature's work in this line. Nature is neither a reliable physician nor a surgeon. We all know that, left to Nature, wounds such as sinuses or cavities in the mouth after operation will close from the top, and cause irreparable injury. Surgery, whether oral or general, demands that these wounds close from the bottom, therefore we use gauze to retard Nature's work. Professor Welsh says: "Nature is neither kind nor grateful, she simply obeys the laws and is very conservative."

I feel sure that we may all agree with the essayist that the most important bodily substance with which we should familiarize ourselves is the blood—not only its composition, its quality, and its pressure, but the conditions which may cause these to vary.

In order to construct a skeleton upon which we would later place flesh and form, we commence with the description of the corpuscles. A red corpuscle is composed of an envelope filled with hemoglobin. This so-called envelope is chemically composed of three substances, the phosphorized fat lecithin, the monatomic cholesterin, and nucleo-proteid, and keeps the hemoglobin from passing through the membrane and dissolving itself in the plasma of the blood. When the red corpuscles lose their power of retaining the hemoglobin, they themselves are dissolved in the blood, and in the treatment of disease we must learn not only what causes the destruction of the blood corpuscles, but also how to formulate methods which will alter the conditions which are conducive to disease. Investigators have demonstrated that the pressure of the plasma is normally less than that exerted within the corpuscles. Any protoplasmic poison will so act upon the envelope containing the hemoglobin that the destruction of the envelope will be followed by a diffusion of the hemoglobin into the blood plasma. This condition we recognize as hemolysis.

Hemolysis may be produced by a variety of causes, but the one cause which interests us most is the change of the blood pressure. As long as the pressure of the blood and that of the corpuscular contents is equal, or nearly so, no hemolysis will occur, and we have what is known as an isotonic solution. If the pressure of the solution in which the corpuscles are suspended is reduced, the corpuscles will absorb the water, swell, and finally burst. There are two fac-

tors which will cause hemolysis. One which devitalizes the tissues of the corpuscles in which the hemoglobin is inclosed, causing a diffusion of the hemoglobin without changing the pressure, and the other which causes a change of pressure between the corpuscles and the blood plasma, causing water to be absorbed by the corpuscles, with a distention, and final destruction. Both of the factors which produce this condition are developed in the blood. According to the experiments of Bourdet and others, we have a definite law, namely, that the blood serum of an animal of a species A, if this animal is repeatedly treated with the blood of a species B, acquires the property of causing hemolysis of species B. Hemolysis may also be produced by feeding an animal with the blood of another animal. Belfante and Carbone have proved by their experiments that when a specific hemolysin is injected into the blood of an animal, death of the animal generally follows, and the hemoglobin is found afterward in the urine.

Nuttall, Buchner, Bourdet, Pfeiffer, and Metchnikoff have also shown that the serum contains another substance which they call alexin, and which has the power of preventing not only hemolysis, but also bacteriolysis. This power is known as cytolytic power, and is brought about by the injection into the blood of substances which will increase the sensitiveness of the disease cells toward the natural tissue cells, and which have the power of destroying them. Bourdet named the substance which he produced in the blood by injection, and which had the same power as the alexin, but to an increased degree, *substance sensibilatrice.* Hemolysins and toxins act exactly alike in their reaction. Hemolysis and agglutination of the red corpuscles generally accompany each other. and in many cases seem to be dependent upon each other.

Gruber, Durham, and Widal discovered that hemagglutinins and bacteriagglutinins are analogous. Gruber believes that the agglutination process is simply one of the stages of bacteriolysis, and Koch has proved that bacteria will produce hemolysis. Wright and Douglas have shown by their experiments that the phagocytic power of the leucocytes was not so active when placed in a test tube after having first washed the leucocytes free from serum, and that their action upon bacteria was greater when the leucocytes were left in a solution with the serum. The logical conclusions which have been accepted and proved were that the serum contained something which either destroyed bacteria or rendered possible their destruction. This substance was called opsonin. Experiments have proved that while the test tube containing the blood corpuscles and serum showed a more marked action upon the bacteria, the effect was due to an indirect bactericidal action of the opsonin, perhaps in the way of causing some change in the structure of the bacteria, which caused them to be attracted by the leucocytes, which in time destroyed them.

It has been known for some time that if gradually increasing amounts of toxic but not fatal material are introduced into the blood of animals, such animals will in a given time be able to withstand amounts which would prove fatal if they were introduced at the beginning. This was perhaps the first step in the development of the idea of producing the substances which help to destroy bacteria by increasing the resistance of that once

indefinable something which we now call opsonin.

The experiments of Landerer in his treatment of tuberculosis by intravenous injections of hetol; of Lowry and Richter in producing leucocytosis by the use of pilocarpin; of Mikulicz in increasing the post-operative infections by injecting nucleinic acid into the periosteum; of Buchner in curing anthrax by producing fever through the injection of sterilized emulsions of Friedländer's pneumo-bacillus; of Bier in producing curative fever by the intravenous injection of alien blood, and of Opie, who has cured or greatly improved the condition of dogs affected with tuberculosis of the lungs by the injection of sterilized pus taken from another dog and injected into the pleura of the affected dog—all these experiments prove the soundness of the essayist's recommendations.

One writer says that there is a physiological and a pathological therapeutics. Physiological therapeutics is the application of means that will directly antagonize the disease. Pathological therapeutics indirectly combats the factors producing disease by working along the lines hinted at or suggested by the organism in its effort to destroy the disease; of these two, this writer says, pathological therapeutics is the better. The essayist has wisely pointed out that the laboratory knowledge, which is so essential and complex, can only be acquired by careful study, before we are capable of doing much work along the lines suggested in the paper. Possibly a word of warning is in order. This work should first be done only by expert pathologists, otherwise the enthusiasm with which all new processes are usually received will cause the individual to believe that all that is required is to inject so many millions of bottled bacteria into the tissues of the patient, the result of which operation is very apt to be failure. Lister, when working on antiseptics, succeeded, because he dressed the wounds of the patients with his own hands, and would not entrust his method to incompetent hands, while Koch suffered failure with his tuberculin.

Nearly all medical progress has been brought about by the recognition that all vital phenomena in both health and disease are subject to intelligible laws. Physiological chemistry, experimental pathology, and therapeutics have destroyed the curtain of doubt, and have set knowledge in the place of superstition and ignorance. The invention of the thermometer, the laryngoscope, the ophthalmoscope, and the speculum have done much toward facilitating the fight with disease; also auscultation, percussion, and microscopy have done their share. All of these additions to the study and the treatment of disease were at one time farther remote from offering valuable curative possibilities than the ones suggested by Dr. Merritt in his very valuable paper.

Dr. Joseph Head, Philadelphia, Pa. Dr. Merritt's paper is so far-reaching and covers such a large field that in discussing it one hardly knows just which point to take up. There is one point, however, that especially appealed to me, and perhaps Dr. Merritt can give us a little further light on the subject. I refer to his remarks on the stimulation of the opsonins by auto-inoculation, which plan sometimes produces a cure. He specially mentioned tuberculosis, and spoke of the fact that certain infections are let loose in the circulation which by stimulating the opsonins cause the patient to recover, and yet, as I understand it, this very

auto-infection is the cause of miliary tuberculosis, a form of tuberculosis that is only interesting from the standpoint of the post-mortem table. One of my dearest friends, one of the brightest physicians the country has seen in years, died in just that way about six months ago. He had suffered from hip-joint trouble since he was a child. All at once inflammation of the hip set in, together with a slow fever; this fever continued, and in a month he was dead. His death was undoubtedly caused by the fact that the tuberculosis had extended and had broken into the veins, and the veins had carried the germs all through the system. This, of course, does not militate against Dr. Merritt's paper, but it simply shows that the number of bacteria that are to be inoculated into the system must be carefully measured, and that although Nature may be very wise, she at times needs to be restrained and guided.

As to Dr. Wheeler's remarks concerning pyorrhea, in which he very truly says that no specific germ for pyorrhea has been discovered, I have noticed mouths in which almost all sorts of germs resided and grew. We naturally would expect infection to be caused by one germ. I have believed that where there is filth, and bacteria are allowed to collect in the mouth and around the teeth, and the resistance of the tissues is lowered, we shall have infection, and this infection would be absolutely in accordance with the kind of germ that happens to be present. If it be the streptococcus, we would have a streptococcus infection. If the staphylococcus, we would have the staphylococcus infection, and if it is the pneumococcus, which is frequently found in pyorrhea, we would have the pneumococcus infection. This, as Dr. Wheeler has pointed out, is one of the difficulties which we shall have to overcome in this particular disease, but if by a process not quite so complicated we could find out the particular germ that is causing the particular pyorrhea, we might by such a process of inoculation prevent the germ from traveling through the lymphatic vessels along the peridental membrane.

I wish to thank Dr. Merritt for his paper, and I feel that the profession is to be congratulated that such an essay has been presented.

Dr. M. L. Rhein, New York, N. Y. Today a contribution to pathology and to the therapeutic process of diseased conditions of the mouth has been presented to us that marks an era in the advance of stomatological treatment. The presentation of this paper, in my opinion, will become of historical value in dentistry. It is such a concise and logical exposition of the pathological conditions that exist in certain conditions of disease of the mouth as has never before been presented to any dental society or in any dental periodical, and the association is to be congratulated that this paper has been presented here. A great deal has been said about the misuse of the name pyorrhea alveolaris, and its confusing effects in regard to the diseases affecting the peridental tissues. The condition of which the writer spoke today is the only condition in which this name is justifiable. His exposition refers to the condition of true pyorrhea alveolaris, and everything that he has said must be taken as relating to this condition, and must not be confused with many other diseases of the peridental tissues. Dr. Wheeler in discussing the paper very properly spoke of the value of finding out the predisposing causes in conditions of this kind and in their treatment. But if we are able

to find the predisposing causes and treat them in time, we do not find that disease of which the writer spoke. The condition that we are discussing is a pyogenic condition of the peridental tissues that may be called the sequence of the exciting cause. Its active condition has passed away; it is decidedly, as the writer has so well said, a condition in which the leucocytes or phagocytes have failed to bring about the clinical effect which we obtain in the majority of cases of this kind. A great portion of the discussion seems to have missed the valuable point, that surgical interference is the keynote of success in the majority of pyogenic conditions of the peridental tissues. You can have as large a quantity of leucocytes as possible in some of these cases, and all you have to do is to proceed with the surgical instrumentation to produce these leucocytes, and still it fails to accomplish its purpose. Wright's investigations have demonstrated to us the fact that in such cases the opsonins are lacking. For this limited variety of cases the antitoxin or vaccine injections are recommended. As Dr. Williams very truthfully said, there is no place in the human economy where natural conditions so greatly tend to produce a favorable condition for this sluggish chronic pyorrheal condition as where there is a lack of opsonins, of which we know so little at the present time. The clinical experience with antitoxin and vaccine injections has, however, demonstrated their value beyond a doubt, and these injections will surely prove to be very valuable in the treatment of true pyorrhea alveolaris. The danger of this treatment lies in an unnecessary use of it, and the secret of the discriminating use of these vaccines lies in differential diagnosis. If we can find the exciting cause, and if an active condition with sufficient opsonic index is present, its use is absolutely unnecessary. I fail to see, however, that there should be any danger from this treatment if it is used intelligently and with discrimination.

Dr. MERRITT (closing the discussion). I first wish to thank those who have added so much to the interest of the subject by their painstaking discussion. I was pleased to hear the note of warning sounded by Dr. Head as to the dangers which may attend auto-inoculation in large foci of infection. Nothing truer can be said than that Nature often needs to be guided. In large foci of infection, such as obtain in pulmonary tuberculosis, the danger lies in the precipitation of unmeasured doses of living organisms into the blood stream, which is not infrequently attended by grave consequences, and always by an exaggeration of the symptoms. It will be remembered that in the use of vaccines one is employing dead organisms, through which the desired immunity is obtained, and this without the dangers which attend the administration of living organisms, as in auto-inoculation. The value of auto-inoculation in the treatment of certain infectious diseases, such as gonorrhea and pulmonary tuberculosis, has been proved to be such as to give it a distinct therapeutic value, and one which must be reckoned with in any study of immunity and of the methods by which it is obtained. In the treatment of the latter disease by auto-inoculation as carried on in the hospital at Frimby, England—to which reference was made in my paper—the distinctive feature consists in that auto-inoculation is systematically induced through the agency of carefully regulated exercise, this exercise being prescribed with the same care

as that which characterizes the employment of any other therapeutic measure. The temperature and the opsonic index are taken at frequent intervals as a guide to the amount of exercise indicated in any given case. An increased temperature with subnormal opsonic index would show that the exercise has been carried to excess. Mild forms of exercise are prescribed in the beginning of the treatment, which is gradually increased as the symptoms permit. until the patient is engaged in heavy manual labor for several hours each day. Herein we see its chief value, namely, Nature's protective forces being guided and directed by skilled hands to the end that such a degree of immunity against the infecting organism is secured as to result in extermination of the bacteria within the foci of infection, and in the complete restoration to health of the patient, and this without the employment of any other form of therapeusis. The success which has attended this treatment has been such as to engage the attention of the whole scientific world. A report of the work being done at Frimby may be seen in the *Lancet* for January 25, 1908.

In pyorrheal infections, because of the circumscribed area involved, little dependence can be placed upon auto-inoculation in the treatment of this disease. Whatever its influence may be, it is probably salutary, as can be seen in massage of the gums. It is doubtful whether auto-inoculation in pyorrhea is ever attended by serious consequences. I had thought that I made it clear to Dr. Wheeler and to others that there is at present no good evidence in support of the theory that there is a specific organism which could be regarded as an etiologic factor in pyorrhea. What I did say was that the organisms universally present in pyorrheal infections are in every instance a complicating factor, and may be regarded as being the chief obstacle to success in the treatment of this disease. On this point Dr. Harold Simms of England has this to say in a recent number of the *Dental Digest:* "However much one may cling to the belief that pyorrhea is a constitutional disease, there can be no doubt that almost all the accompanying symptoms and complications, slight or otherwise, are due solely to the enormous quantity of pus-producing staphylococci that I have described as being invariably present." The value of the opsonic treatment depends upon the fact that vaccination with a quantity of killed bacteria of the same nature as those present in the infected area has the effect of increasing the bacteriotropic substances of the blood, so that the patient is himself enabled to overcome the disease by the stimulation of his own protective machinery.

The next order of business was the reading of a paper by Dr. Eugene S. Talbot, Chicago, Ill., on "Acidosis, Indicanuria, Internal and External Secretions: the Effects upon the Alveolar Process and Teeth," as follows:

Acidosis, Indicanuria, Internal and External Secretions: The Effects upon the Alveolar Process and Teeth.

By EUGENE S. TALBOT.

Research work upon diseases of the mouth, jaws, and teeth from a local viewpoint has only partially solved the problems. Miller demonstrated that lactic acid ferment is the immediate local cause of tooth-decay, but he did not consider the underlying factors, namely, the constitutional causes. The same is true of all other diseases, such as irregularities of the teeth, interstitial gingivitis, erosion and abrasion, sensitive dentin, diseases of the dental pulp, etc., because the fact was ignored that a constitutional element enters into all the pathology of these structures.

Advancing from the lowest vertebrate (the sea-squirt) through the different forms of life, from fish to reptile and from bird to mammal, including human embryogeny, the various phenomena encountered in the study of the pathology of the head, face, jaws, and teeth can be accounted for.

In my studies of the pulp (*cf.* bibliography Nos. 1, 2, 3) I demonstrated that scarcely one could be found without disease. Inflammation, abscesses, nerve-end degeneration, thrombosis, dilated vessels, arterio-sclerosis, endarteritis obliterans, pulp-stones, calcareous deposit, fatty degeneration, hyaline degeneration, fibrosis, and other diseases were found, sometimes followed by spontaneous death of the pulp. Discoloration of the teeth takes place with man's advance in years, oftentimes very quickly in disease; and under certain conditions, also softening of tooth-structure and death of the fibrillæ. Decay of the teeth at the cervical margin is very serious in certain constitutional states, as well as softening or discoloration, or both, of dentin under moisture-tight fillings, while sensitive dentin is very troublesome at times. Teeth grow harder as age advances, but when pathologic changes in the internal secretions occur, the teeth gradually grow softer. I also demonstrated that the pulp and the alveolar process are doubly transitory structures, therefore more liable to disease and the first to be involved in constitutional disorders. In pulp-evolution the tissue is healthiest and at its best when it begins to form dentin. As the dentin is formed the pulp degenerates, and, like the covering of the chrysalis, after it has performed its mission in life it becomes useless. The pulp, then, as well as the alveolar process, is an easy prey for disease.

Many theories have been advanced for these various lesions, and oftentimes one theory which seems tenable in a given case must be discarded and another must be proposed for the same condition in other mouths. Again, a cause advanced for one lesion is seldom satisfactory for other lesions even in the same mouth.

A scientific law based on a given hypothesis and to be accepted as correct must not only explain all the facts but must exclude all other explanations. Working upon such an hypothesis, it is my intention to present a theory that may

be applied to all the lesions previously mentioned. In my paper on "Acid Auto-intoxication and Systemic Diseases the Cause of Erosion and Abrasion," I demonstrated that under certain conditions of the system there is an abundance of indican, excessive urinary acidity, and excessive acidity of the stomach. The causes bringing about acidosis are—Excessive eating, and drinking of stimulants; all forms of nerve lesions, producing nervous dyspepsia; fruits, acids of all kinds, diseased and tired eliminating organs, and a lowered vitality. Many cases have also been recorded where grief, mental worry, nervous breakdown from overwork, neurasthenia, paretic dementia, tabes, ataxia, lesions of the heart, artery, and kidney, are associated with rapid decay of the teeth, with interstitial gingivitis, pulp-degeneration, softening of tooth-structure, decay of the cervical margin, sensitive dentin, and with a red, swollen, and fissured tongue. In these conditions there is always a marked interstitial gingivitis, occasionally pyorrhea alveolaris, while in disease, and especially in lues, rapid softening, discoloration, and destruction of tooth-structure take place. A marked illustration of this condition is found in the case of a forty-three-year-old man, weighing 250 pounds, who had lues for five years. While the deep-seated glands of the groin alone were involved, and a slight rash on the arms and back was present, supposed to be due to poisoning from a colored shirt which the patient had worn three years previously, nothing of any consequence was noticeable except a destruction of the alveolar process, beginning at the third molar on both sides of the upper jaw. The patient had well-developed jaws and teeth; no cavities were present. The teeth occluded squarely and were very much worn. It was a marked case of erosion. The teeth were discolored. Interstitial gingivitis had caused destruction of the alveolar process to the extent that two molars on the right side and one on the left were lost. The other molars were beginning to loosen. The effects of the internal secretions were especially demonstrable upon the alveolar process and the teeth. This patient's case baffled the skill of five physicians, and he had received no specific treatment. The degree of urinary acidity was 70.

Continued acidosis, intestinal fermentation causing indicanuria, heart and artery changes, as well as kidney lesions, produce auto-intoxication. In acidosis, intestinal fermentation, and auto-intoxication there is a deficiency of alkalinity of the blood. In all diseases of faulty metabolism of the system, in pregnancy, etc., there is nearly always an abnormal degree of urinary acidity. The degree varies, not with age, but with the severity of the systemic changes. I have never tested the urine of so-called acid babies; but in children of four years of age suffering with bronchitis I have found the degree of urinary acidity to be as high as 108. In a fifty-five-year-old woman suffering with severe rectal pain the degree of urinary acidity was 114. Luetics have the highest degree of urinary acidity, varying from 64 to 146. It is more often over than under 100 degrees.

Acidosis frequently is a family characteristic, hence it constitutes the reason why certain diseases like interstitial gingivitis, decay of the teeth, erosion, abrasion, tooth-discoloration, sensitive dentin, pulp-diseases, pulp-destruction, tooth-softening, gout, rheumatism, arterio-sclerosis, kidney lesions, various forms of neurasthenia, etc., are associated

with one another, and are supposed to be inherited.

Indicanuria is a manifestation of a blue coloring substance in the urine. It is derived from indol, which forms indican. It is supposed to be due to three sources; first, to intestinal fermentation and putrefaction of nitrogenous substances; second, to suppuration in some part of the body; and third, to the formation of indol in the cells of the body tissues. The fact that indican is found in the urine is a sufficient indication that this poison has circulated in the blood throughout the entire system and has been returned to the kidneys to be expelled. I have demonstrated many times that indicanuria and neurasthenia are in some way related. Reducing the intestinal fermentation and putrefaction by the use of intestinal antiseptics, the neurasthenic condition of the patient is often relieved. The toxic effect of acidosis and indican upon local tissues, especially upon terminal and transitory organs, is very marked. Their injurious effects consist of irritation in the bloodvessels. The salivary glands, the mucous glands, the alveolar process, and the dental pulp are the first structures to become involved.

Indicanuria is one of the great sources of auto-intoxication. The toxins of indican permeate all the structures of the body, being carried by the blood circulation. While acidosis and indicanuria may go hand-in-hand, the quantity of indican depends to a certain extent upon the acidosis relative to the amount formed in the intestines. Thus, upon reducing a high degree of urinary acidity to normal or below, the indican will be increased, owing to the abnormal bacterial activity in producing putrefaction. These germs seem to thrive better in alkaline than in acid media. An accumulation of indican in the system will often cause febrile disturbances, lassitude, and gastro-intestinal irritation—depending, of course, upon the severity of the attack. The effect of indican is not unlike that of poisonous drugs such as mercury, lead, phosphorus, bromid, quinin, etc., which produce poisonous symptoms in some individuals. In others there are apparently no ill effects. It must, therefore, not be overlooked that in all persons with persistent indicanuria the poison is continuously absorbed from the intestines into the circulation for months and years, and that in many persons it will not manifest itself until the periods of stress at forty-five and again at sixty years of age. Metchnikoff, in considering the phenomena of old age, concludes that auto-intoxication due to intestinal putrefaction is one of the most important causes of premature senility, in that it causes arterio-sclerosis. The accumulation of these toxins in terminal organs, such as the pulp and alveolar process, is as disastrous as the accumulation of any of the poisonous drugs. Arterio-sclerosis is one of the common diseases found in the alveolar process and in the pulp, which is a positive proof of its systemic origin.

The research work on urinalysis in cases in which pathologic conditions of the mouth were present was begun in March 1901, and has been continued to the present time. During that time, 287 urinalyses were made. All these cases showed acid mucus; in some, acid saliva and interstitial gingivitis; in many, erosion and abrasion was present. All of these patients, and some who did not have erosion and abrasion, possessed soft teeth. In many cases, the cervical margins of the teeth were sensitive. Those

in which interstitial gingivitis had progressed so far that the teeth were removed and the pulp was examined were found to be pathologic (*cf.* bibliography Nos. 4, 5).

The first 50 cases were reported in my article on "Interstitial Gingivitis due to Auto-intoxication as Indicated by the Urine and Blood Pressure Diagnosis" (*cf.* bibliography No. 6); 129 cases were reported in my article on "Acid Intoxication or Acidosis a Factor in Disease" (*cf.* bibliography No. 7), and on the last 108 cases I have now to report:

The degree of acidity showed in three cases 10 degrees, two 11, one 13, one 14, two 15, four 16, four 17, two 18, three 20, three 21, five 23, three 24, five 25, one 26, one 27, one 28, four 30, two 31, two 32, three 34, two 35, three 37, seven 40, one 41, one 46, two 48, one 49, three 50, one 51, one 52, two 53, one 55, one 56, two 58, one 59, one 60, three 62, two 63, one 64, one 66, two 70, one 74, four 75, one 76, one 78, one 79, one 80, one 83, one 84, one 100, one 104, one 105, one 108, one 110, one 113; two alkaline. Indican was present in 53, a trace of indican in 18, none in 36, and no observation was taken in 21. The normal degree of urinary acidity is from 30 to 40.

For a number of years I have made observations, and I have reported cases of interstitial gingivitis, erosion, abrasion, discoloration, and softening of tooth-structure among tabetics and paretic dements (*cf.* bibliography No. 8). Urinalysis was made in thirty-five tabetics and twenty-five paretic dements. All the paretic dements showed urinary acidity, while only four tabetics were alkaline. The alkalinity was due to cystitis. All showed indican in a greater or smaller degree. The fact that the urine was normal at the time of the examination is no proof that it was not acid and did not contain indican four weeks before, or that it would not be excessively acid with an abundance of indican four weeks later. I have demonstrated this variation many times. The condition of the excretions of the body depends upon the habits and the mode of living of each individual, and these change constantly. A long-continued acidity of the urine and an accumulation of indican in the system soon produce marked impressions upon the jaws and teeth.

The method of obtaining the degree of acidity of the urine, as given by Neubauer and Vogel, is very simple (*cf.* bibliography No. 9). The instruments necessary are one burette 50 ccm., one wooden stand, one Barnes's dropping-bottle, one 10 ccm. graduate, and one small glass. Place the burette in the wooden stand in an upright position; fill the tube with the solution (deci-normal sodium hydrate) to exactly 0. The degree of acidity is obtained by taking 10 ccm. of the urine specimen measured in the graduate glass, and pouring it into the small glass; add four drops of phenol-phthaleïn; then add drop by drop NaOH (deci-normal sodium hydrate) until a slight pinkish color is produced. Having noted on paper the number of ccm. of the NaOH in the burette before and after the pink color is obtained, the number of ccm. displaced multiplied by 10 (in order to find the number of ccm. of NaOH necessary to reduce 100 ccm. of urine) equals the degree of acidity. Each step in this operation must be carefully performed, and each instrument must be kept perfectly clean, in order to get good results.

The normal degree of acidity of the urine is from 30 to 40. When the degree is below 30 (the difference between

the degree indicated and 30 shows the degree retained in the system), it indicates either renal insufficiency or excessive suboxidation, producing renal strain. In cases in which the degree of acidity exceeds 40 there is excessively imperfect oxidation, which, irrespective of the types of acid, underlies, as is now almost generally recognized, severe constitutional stress allied to that of diabetic acidosis.

The question arises, Does the quantity of urine passed in twenty-four hours influence the degree of acidity? Thus, if more than forty-eight ounces, *i.e.* the normal amount, were passed, the degree of acidity would be low as compared with less than forty-eight ounces. There is a relationship between the polyuria produced by nerve and other strains in seemingly normal persons. This occurs in students taking examinations, and in certain hysterics under excitement. The eliminatory functions of the kidneys are interfered with, but the watery excretory powers are increased. There is real, albeit not nosologic, renal insufficiency, producing a condition temporarily analogous to diabetes insipidus. The state is not normal but is not necessarily nosological.

On application of the phenol-phthaleïn, if the urine specimen turns pink, it is alkaline, therefore no degree of acidity can be obtained.

To obtain the amount of indican in a given specimen, take five ccm. of urine; pour it into a test tube; add five ccm. of hydrochloric acid, and shake thoroughly. Let the mixture stand for a few moments. Add ten drops of hydrogen dioxid, shake thoroughly, and let it stand for a few moments; then add one ccm. of chloroform, shake thoroughly again, and let it stand. If indican be present, chloroform will absorb it, turn blue, and settle to the bottom of the tube; if there be no indican the chloroform will remain white.

The toxins in the blood which are the result of acidosis and indicanuria are carried to all structures of the body. All structures of the body, however, are not alike. Some, especially those that are active and are needed for the welfare of the body, under the law of economy of growth or use and disuse of structures, can take care of the toxins and return the blood to be cleansed of its impurities. Other structures which are of little use, and are called terminal organs and transitory structures, such as the dental pulp and the alveolar process, cannot dispose of the blood so readily. The result of this is an accumulation of toxins, and disease follows. Other terminal organs that can stand the strain a little better, but are sure to succumb later, if the toxins continue to be present in the blood, are the kidneys, the heart, the liver, the eye, and the brain.

One object of this paper is to bring before the profession the fact that early symptoms of systemic disorders may be recognized, and prophylactic means may be adopted to ward off future trouble. Heart pressure, endarteritis obliterans, anterio-sclerosis and dilated arteries are easily demonstrable in the pulp and in the alveolar process by early symptoms of acidosis and indicanuria. It will be seen, then, that acidosis and indicanuria are factors which cannot be overlooked.

To ascertain the blood pressure in those of my patients that suffer with interstitial gingivitis, I used Cook's modification of the Riva Rocci sphygmomanometer, this instrument being exceedingly simple and best adapted for my convenience. The armlet used was sold with

the instrument and consists of a rubber bag 4½ by 40 cm. The patients ranged from twenty-seven to sixty-seven years of age. With this instrument the normal adult female arterial blood pressure is 115 to 125 mm. Hg; adult male, 125 to 135 mm. Hg.

Among twenty-six females, there were three who ranged between 115 mm. Hg and 125 mm. Hg, and were therefore normal. Three ranged below 115 mm. Hg, and twenty from 135 mm. Hg to 180 mm. Hg.

Among twenty-four males. there were eight who ranged between 125 mm. Hg and 135 mm. Hg, and were therefore normal. Three ranged below 125 mm. Hg, and thirteen from 135 mm. Hg to 160 mm. Hg.

When we consider that thirteen of these patients were under forty-five years of age, the high blood pressure is remarkable.

It is needless for me to enter into a discussion of interstitial gingivitis at this time, since I have covered this subject in my last three or four papers. I will say, however, in regard to this disease that the toxins in the blood irritate the tortuous bloodvessels running through the alveolar process, and because it is an end-organ and a transitory structure, a low form of inflammation is set up, and absorption takes place. When there is an excessive urinary acidity and indican, the mucous glands of mouth and vagina and the sweat glands of the skin secrete an acid fluid. If the urinary acidity and indican persist, the salivary glands will secrete an acid saliva. The blood has a diminished alkalinity. The more persistent and prolonged the urinary acidity, the less the alkalinity of the blood and the greater the acidity of the mucus, saliva, and sweat.

Before proceeding farther with our pathologic research, let us consider briefly the changes which the tooth and the tooth-pulp undergo on account of the toxins in the blood. The pulp is a degenerate organ. It has degenerated in its evolution from the lower vertebrates. It also degenerates in forming dentin. It is at its best when it begins to form dentin. The blood enters the pulp through a small opening by way of a small artery and escapes by a small vein. It is, therefore, like the alveolar process, not only an end-organ, but markedly transitory. It is virtually a ductless gland. What is the nature of ductless glands? All ductless glands are secretory. The pulp, in all probability, like other organs has internal secretions. Other ductless glands are the liver, which has two functions, first that of excreting or destroying poison; second, that of blood-making. The poison destroyer has a duct, the other has not. The testes and ovaries each have two functions, first, a reproductive one; second, a secretory one for the nourishment of the body. To use a better illustration, the bone marrow, which roughly corresponds to the pulp, has a blood-making function of producing bone cells, but it has no duct; its product returns to the circulation. All are familiar with the action of the other ductless glands. The pulp is a most marked example of an end-organ without a duct, but its product, under the general law of ductless organs, must pass into the general circulation by absorption in the blood-vessels. The pulp secretes or excretes toxins from the blood which pass through the fibrillæ and destroy them, soften the tooth partially or the dentin and enamel entirely, and destroy the cement substance between the enamel rods.

In some cases of systemic changes due to disease and acidosis, teeth will suddenly discolor and pulps die without decay or external action. Not infrequently, pulps will die one after the other in teeth in one mouth without apparent cause. In other teeth, pulps die no matter how well or how carefully the teeth may be filled. Changes in color and density, and pulp-disease frequently occur in people over thirty-five years of age without decay. Acidosis and indicanuria are more frequently observed after that period, partly due to the tired-out eliminating organs.

The question arises, How do we know that toxins are excreted by the pulp? I have demonstrated this in four cases. In the past ten years I have cracked open more than six thousand teeth. The pulps were tested for acid by litmus placed on paper and upon plaster disks in the manner described by me in other papers. While the litmus test is crude and uncertain, I have had a number of good results. The plaster-of-Paris method is more successful. In all cases the specimen was examined by a magnifying glass. Not a large percentage of cases was discovered—and it could hardly be expected. It would be very difficult to obtain many teeth from favorable people with acidosis. The fact, however, that such conditions are present, and that acid pulps are found by such crude methods, is sufficient to account for the changes taking place in pulp fibrillæ, dentin, and enamel.

Sajous says (*cf.* bibliography No. 10): "The axis cylinders of all nerves and the dendrites of neurons are found to contain a fluid identical with the blood plasma in its reaction to staining fluids. Even the neuroglia fibrils asserted their identity as plasma-capillaries, the neuroglia feltwork of two substances of the brain and cord representing the intrinsic circulation of these organs. The muscular contractile structures, the various glandular organs, including the liver, pancreas, and spleen, the gastric and intestinal glandular elements, etc., were all found to be so disposed as to allow the free circulation of this oxidizing plasma, the red corpuscles passing on in the larger channels."

It will be seen, therefore, that toxins and acid conditions may circulate freely from the pulp through the tooth-substance by way of the fibrillæ and decalcify tooth-structure. The decalcification may be only slight and the fibrillæ may lose only part of their sensitiveness. The pulp may partially lose its sensitiveness on account of nerve degeneration. This tissue is frequently removed without pain and without the application of drugs. On the other hand, decalcification of the teeth has been observed by all dentists to the extent that the calcium salts have been entirely removed in a few months. The remaining substance could be scraped off like horn. Again, it has been observed that the crowns of teeth have decalcified so that nothing remained except the clean roots protruding through the gums.

The degree of decalcification and the rapidity with which it is performed will depend entirely upon the cause of the toxins in the blood and upon the severity of the disease which produces them. The simpler forms of toxins and changes in structure in the mouth are those in which the individual gradually grows old without disease. The eliminating organs become tired, the result of which is that a certain amount of toxins is retained in the blood. Excesses in eating, or drinking stimulants, or both, are fruitful

sources of acidosis and indicanuria. If the kidneys do not become involved, the individual will survive until the senile period of stress—at about sixty—when heart failure or apoplexy results, owing to decay of the arteries. All the diseases of the jaws and teeth will have been experienced. Frequently the kidney, liver, and other organs of the body become involved during this flight from youth to middle age. The most rapid degree of decalcification of the teeth takes place in lues, where the highest degree of urinary acidity and the largest quantity of indican are to be found. In such cases, I have seen comparatively healthy teeth in young men decalcify, with cavities in nearly all the teeth; the destruction of the alveolar process takes place in six to nine months' time. The extent of decalcification, of destruction of the fibrillæ, and of pulp lesions, depends upon the severity of the toxins in the blood. The teeth, having lost their power of resistance, may easily take on decay, erosion, and abrasion. The destruction of the fibrillæ already has caused discoloration.

Having shown the effects of internal secretions due to acidosis and indicanuria upon the structures of the jaws and teeth, we will now study the effects of external secretions, due to the same causes, upon the teeth. We showed that the degree of acidity of the mucus and saliva, which are external secretions, depends upon the degree of toxins or upon the diminished alkalinity of the blood. Friction of a foreign substance, like a tooth-brush, of the lower teeth against the upper, of the lips or tongue, will cause wearing away of the softened tooth-structure without the aid of acids. The latter, however, greatly assist in this operation. The acid mucus collects upon the teeth, and, with the aid of friction, quickly destroys tooth-structure. When the saliva becomes acid, teeth which have lost their resistance easily become affected by erosion and abrasion. Tooth-softening permits any or all of the acids in the mouth, including lactic acid, to act upon tooth-structure and to cause disintegration. The acid external secretions, dripping upon the surface of the softened teeth, will cause disintegration without friction. A further discussion on erosion and abrasion will be taken up in my next paper.

The subject of tooth-decay is such a vast one that only a few obscure points will be considered in this paper. At the meeting of the International Dental Congress at St. Louis (*cf.* bibliography No. 11), I asked an explanation of the following case from Dr. Miller, in discussing his paper: A girl of thirteen years had her teeth put in thorough order before going to a preparatory school. Upon her return at the end of the school year there was decay about the fillings, and also many new cavities had developed. Dr. Miller's reply was that the young lady had been eating chocolates. This hardly explains the condition. If she had been eating chocolates—which she had not—she might have brushed her teeth after eating them and thus have removed the local condition. Experience has taught me that close confinement in school, hard study, monotony in diet, ambition to excel, homesickness, want of fresh air, of sunshine, and of exercise, worry and nerve strain from examinations, produce acidosis and indicanuria, which in turn cause changes in the internal and external secretions, which reduce the resisting power of the teeth, thus causing their rapid decay. Every dentist has had such an experience. Teeth decay rapidly during preg-

nancy as well as in disease. Teeth frequently decay very rapidly in senile periods, when they are supposed to be the hardest, and when little or no decay had occurred previously. Teeth have decayed and the enamel has become very brittle while an abscess was forming and discharging from the pelvic cavity. Teeth frequently decay rapidly and the alveolar process becomes absorbed in patients suffering from grief, worry, and overwork. I have recorded a number of such cases. There is a vast difference between the processes of decay of the teeth as observed in the skulls of the most ancient races, such as the lake-dwellers, the cliff-dwellers, the mound-builders, and those of the teeth which you and I are treating today. There is a vast difference between the decay of the teeth of the negro races in the North and similar pathologic processes in those who trace their ancestry in this country back for 250 years. There is a great difference between the decay of the teeth of those living in the Northwest and the decay occurring in the inhabitants of England, Ireland, Scotland, Wales, and here in New England and its vicinity. These differences are due to evolution and degeneration. Environment is next in importance, including degeneration. These changes in tooth-structure due to systemic changes must be studied and understood before we undertake to apply local theories.

You all have seen decay of the cervical margin take place rapidly in the mouths of some of your patients who scarcely ever masticated their food, as well as decay in the mouths of sick, anemic, and poorly nourished children. The results of this are toxins in the blood, causing the mucous and salivary glands to discharge acid secretions, which, in turn, unite with the decomposing food accumulating about the necks of the teeth. The teeth have lost their resistance from internal toxins acting through the pulp. Sensitive dentin can also be accounted for in a majority of cases as being due to an acid condition of the mucus and the saliva influenced by systemic changes.

Dr. Elliott P. Joslin of the Harvard Medical School (*cf.* bibliography No. 12), in his researches and writings has added many data to the subject of acidosis, especially in relation to diseases of such end-organs as the kidney, liver, brain, etc. His studies have been conducted upon animals and human beings in diseases such as diabetes, coma, etc. He says, "The reaction of the blood in diabetes confirms the view of an acid poison." The worst forms of tooth-softening, discoloration, erosion, abrasion, and interstitial gingivitis are found in connection with these diseases. These diseases, however, are far advanced in end-organs such as the dental pulp and the alveolar process long before they are manifested in end-organs in other parts of the body. This is another illustration of the fact brought out by me in other papers, that acidosis and indicanuria are the principal causes of diseases of the alveolar process and of the teeth, and it confirms a statement which I have frequently made, namely, that the educated dentist, by observing symptoms in the mouth, is able to warn his patient of the approaching storm, while the physician rarely sees the patient until the storm has broken. A reduction of acidosis and indicanuria—two of the visible signs of toxins in the blood—and a preservation of normal conditions, will overcome many of the pathologic conditions found in the mouth.

This newer and broader pathology, which recognizes the constitutional causes

of diseases of the mouth, opens up a new vista on the horizon of successful dental practice.

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Discussion.

Dr. S. A. Hopkins, Boston, Mass. In speaking on this subject I wish to say that no one in the profession is more deeply impressed with the injurious results of proteid decomposition than I am. With me this is a fetich, an obsession. I feel that the injurious effects of the absorption of toxins, the result of proteid decomposition in the intestines, has never been fully recognized by dentists, and am grateful to Dr. Talbot for bringing this matter again to the attention of the dental and medical professions.

Now, if it is true, as Dr. Talbot suggests, that the various diseases which he calls attention to as affecting the pulp are caused by a decomposition of proteids which produce indol, and show indicans in the urine, then we have one of the most important and startling facts in medicine. We have here the explanation of those wonderfully subtle influences which are known as susceptibility and immunity. We should, then, have organs susceptible to disease if indol and other poisonous products of decomposition are taken up by the system, and immunity if the poisons are absent, and we could judge by the presence of indicans whether the patient is susceptible or immune. We would know why the texture of the teeth seems to vary and why the teeth become more susceptible to decay at certain periods than at others. We should be able to explain the absorption of the alveolar process and its variations, if, as I say, we should be able to establish the truth of this important theory. If we could believe that in acidosis and indicanuria we have found the true explanation of these changes which take place in the teeth, we should have gone far toward the control and improvement of the influences which affect these organs. The explanation given by the essayist is brilliant, fascinating, and one which we should be glad to embrace, but I cannot believe that we are fully justified in accepting this theory until the matter has been more fully investigated.

If we find that tooth-degeneration and disease result chiefly from indicanuria, the remedy would be that pointed out by Metchnikoff, *i.e.* the introduction into the intestines of the bacillus of Messol by means of yoghourt, which is the sour milk produced by this bacillus. Other lactic organisms might also be used with marked effect, and these no doubt might cause the desired immunity from disease and the marvelous prolongation of life

which has been noticed in those people who live upon sour milk. Some people might feel that dentistry and death were to be preferred to this remedy.

For the treatment of diseases of the digestive tract, for Bright's disease, arterio-sclerosis, many skin diseases, gout, rheumatism, etc., this treatment is said to be warranted. I question, however, if we are as yet justified in depending upon it for the control of the ravages of dental caries.

Dr. Edward C. Kirk, Philadelphia, Pa. It is a matter of great encouragement to me, Mr. President, that a paper of this sort has been presented to this body, and that it has been so sympathetically received. I have watched the work of Dr. Talbot for many years with a great deal of interest, and while I have disagreed with him at times, I am thankful to him that he keeps everlastingly hammering away at it and attracting the attention of his *confrères* to the point that there is something more, something larger, something greater in our professional work than the simple repair and patch-work we are so much inclined to do, and which demands so much time and attention. I agree with him, as all must agree with him absolutely, that we cannot ignore the constitutional factor that is behind our work. We are working on vital bodies and with living things, and we cannot get rid of that factor in our work. Therefore the subject that he brings before us today is to my mind—I may be over-enthusiastic about it—the most important problem that we have to consider. It goes without saying that it is a vast problem, and an intricate one, and I gather from the hearing of Dr. Talbot's presentation and from the reading of his paper that he comes before us not in a dogmatic way, with a cut-and-dried and finished answer to this problem, but that he offers us a working theory, an hypothesis, a point of view, and in that spirit we must accept it. I am thankful to him because his report is suggestive of things to be done, and of ways to do them.

I have for a number of years myself been interested in this problem, but I have been making my attack upon it from a somewhat different point of view. I am working toward the same end in the solution of this same vital problem in respect to its effects in the mouth as we observe them. One of the most important things in attacking a problem of this sort is our attitude of mind toward it, and the necessity of creating, as it were, a portal of entry into the subject so that we can attack it. You remember in the story of Faust that he knew that he was under the influence of some evil spirit; he did not know what it was, but he felt the effects of it, and you remember the incantation scene, where he brings this evil spirit before him so that he could parley with it, and squarely discuss the case with it.

Each man attacks the problem of disease in a different way. My portal of entry has been, as I say, from a somewhat different direction than that taken by Dr. Talbot. I have been studying this question from the standpoint of normal physiology—that is, the study of the human machine as a machine in its normality and then in its variations which we call pathology; and one of the first things that impressed me very strongly is the necessity for creating in our minds some sort of ideal standard or norm before we can say what is abnormal. I have looked upon the normal healthy human being as the individual in whom in the various processes of this

complex act of human nutrition a balance or equilibrium of all the factors exists; not a static but a moving or progressing equilibrium. So with that fundamental conception I have tried to study the factors of this normal process of nutrition, and it has been borne in upon me very strongly that we have the very closest analogies between the metabolic process of the living body and the ordinary processes of combustion. The body has been likened many times to a furnace in which fuel is taken and used up, with the resulting growth of tissue and evolution of energy expressed in terms of heat, etc. There must be a correct definite ratio between these factors, and I was particularly struck with certain statements that Dr. Talbot has made in his paper with reference to the existence of the condition which he speaks of as acidosis, formation of indican, etc., the result of faulty metabolism, which we find expressed most pronouncedly in those individuals whom he speaks of as alcoholics; that is, in individuals not afflicted with any acute form of disease, but simply people who have gone wrong from bad methods of feeding; they are in a class by themselves, and constitute a very interesting class. I regard these people somewhat as the motorist regards the management of his car. We have frequently had our attention called to the offensive, disagreeable odor and smoke coming at times from the exhaust of this traveling combustion engine, and we say right away—if we have any proper knowledge of these things—that that fellow's carburetor is not adjusted properly, that he is overfeeding his machine, that he is giving the machine too much gasoline, and not enough air to burn it; and when he adjusts his fuel and air supply properly, he reduces this offensiveness to a minimum and gets more power out of his motor. It means that the machine is not properly metabolizing its food. Then what happens? The same thing that may happen to us under similar conditions—he loses power just in proportion as he fails to make the machine metabolize its hydrocarbon food, and the machine runs down. This may happen, for example, in the country, and not knowing how to correct the trouble, the amateur motorist goes off for help; while he is gone the machine is at a standstill, and the usual ragamuffin comes along and toots the horn, and there being no interference, he toots it some more. Then some of his more adventurous companions become encouraged and get into the machine with their dirty shoes and destroy the covering to the upholstery—produce skin disease. They get in because the machine is not going and cannot go; they enter because they can and because the machine being unable to go at speed cannot keep them out. These ragamuffins that get in are the microbes that finally ruin the car. Now, there is something in normality, something in normal health. Whether you express it as the opsonic index or whatever you may call it, there is something concerned in the condition we term normal health that is in itself a defense against the attacks of bacterial agents. So my interest has concentrated itself upon an effort to bring about normality of nutrition—to so adjust the nutritive mixture for the individual that the amount of energy expressed in units of power shall reach the normal physiological maximum; for under these circumstances I don't think we need fear the attacks of the ordinary microbe.

So much for the analogy. Now we come to practice in regard to it. I

have been making a large number of experiments, both in the laboratory and clinically, as Dr. Talbot has, and I have found in my own way that in the question of acidosis, also of indicanuria, there is a relationship of these things to the food habit which has interested me very much. I do not wish to be regarded as making a dogmatic statement, but that is the trend of my feeling about it; that the question of faulty metabolism in a given individual depends upon two things—the amount and the kind of his food in relation to his oxygenating capacity. We get different expressions as these factors are varied. If we take an individual who is fed upon an almost exclusive carbohydrate diet, and if we increase the carbohydrates beyond the point where his oxidizing power is sufficient to burn them up, then we get acidosis of a definite type. This acidosis is most interesting, not only with reference to its terminal expression, in its effect upon the mucous glands of the mouth, but upon the glands of the skin, in its power to produce skin eruptions and in its irritating effect upon the urinary passages; it is interesting also because the general nutrition is disturbed during the period of the high acid wave. Now, if this high carbohydrate feeding continues over a considerable period we do not always have a uniform degree of urinary acidity manifested, but it takes the form of a curve gradually increasing until it reaches a maximum, and then it tends to decrease, and it is during the maximum period that we have developed that condition described by Ralfe of London and Tessier of Lyons, France, known as phosphate diabetes. There is over-oxidation of the carbohydrate foodstuffs with a loss of the phosphate element, due to excessive carbonic acid formation which converts the basic phosphates into the more soluble acid phosphates, all caused by improper feeding of carbohydrate food in greater quantities than the individual can burn up. I have tested that out pretty thoroughly and to my own satisfaction, and by re-arranging the food-habit in such a way that the individual gets no more than is properly digested, reducing the carbohydrates and increasing the proteids, I reduce the urinary acidity, and tend to stop the running away of the phosphates and the basic salts by way of the urine.

This is the expression of faulty metabolism in that disorder which we call arthritism—in that class of diseases which the French have very properly, I think, termed diseases of suboxidation. When the individual has insufficient oxidizing power to burn up the nitrogenous products properly, then he develops auto-intoxication, not only by the absorption of intestinal toxins, but by the production of improperly oxidized nitrogenous products, the group of non-oxidized nitrogenous end products which are typified by uric acid, and these are deposited, as Dr. Talbot knows, in the articular apparatus of the body, with a predilection for the pericemental ligament. I called attention to this matter in a paper which I read in Baltimore at the beginning of this month, and to the coincidence, which I think all have observed, of chemical erosion and interstitial gingivitis in the same mouth. What I want to call attention to today is that they do not exist necessarily at the same time, but that one precedes the other. Some may question that, because we have never yet seen a case of active pyorrhea in a mouth with acid saliva. But the reaction of the buccal secretions changes from time to time as the food habit changes. I regard ero-

sion expressions and acidosis expressions as being distinctly a mark of over-carbohydrate-feeding, or hyperacidity, whereas in the opposite case we do not have erosion, but we do have a tendency to articular destruction.

About many things in the paper I would like to have more information. Personally, I may say, I have not regarded the presence of indican in quantity as being a proof that we had in it a highly toxic element, but I have rather regarded it as a coefficient of the degree of faulty metabolism which produced the indican as one of its terminal products. In other words, there is something behind the indican. Notwithstanding that, I am perfectly willing to admit that it is wise to note that we are dealing with a vicious circle, and that by the absorption of these waste products we have metabolism more definitely interfered with and an increase of these irritative waste products as the result of that vicious circle.

I wish to apologize for taking so much of your time, but I did want to come here, and as a matter of fact I came here especially for the purpose of adding what little I could to reinforce the position of Dr. Talbot in this matter, and to try to arouse a still larger interest in what I believe to be the most important question before us now as dentists—one which certainly will be the problem of the dentistry of the future to solve, because upon the practical solution of this thing will depend our success or failure in treating a large group of the pathological conditions that come before us.

Dr. J. P. Gray, Nashville, Tenn. I wish to thank Dr. Talbot for this excellent paper, and also Dr. Kirk for his discussion of it. I have had some experience in the treatment of pyorrhea, following the line of treatment suggested by Dr. Talbot, and I had the pleasure of being in his office for ten days and watching his successful treatment of pyorrhea by the elimination of indican and acid. I therefore took it up in my own clinic, and have met with wonderful success. I cannot understand how anyone can fail to appreciate the fact that if we have a poison in the blood, such as we certainly have if we have indican, we must eliminate that poison before we can successfully treat the disease. Every dentist should and can make an examination of the urine, and determine whether there is an excess of acid and whether there is indican, and you will find that your patients will recover much more quickly if these are eliminated.

Dr. Kirk referred to the burning up of the excess. I know from my own personal experience that during a breakdown of my own physical condition from nervous trouble and overwork, after eliminating the nitrogenous foods I began to improve as I began to eliminate the acid and indican from the blood, and I wish that everyone here would study this paper and Dr. Kirk's discussion of it after their publication.

I wish to say while on the floor that I do not believe that to this association within the past fifteen years a more scientific paper than that of Dr. Talbot has been presented. We as a profession must begin the study of the science of medicine, and then prevent disease, instead of trying to fill teeth all the time.

Dr. Talbot (closing the discussion). The only reply to Dr. Hopkins that I wish to make is this, that these pathologic conditions in the mouth are due to toxins in the blood. They can be definitely studied by such visible signs as urinary analysis. By treating these conditions

of the blood, we restore the local manifestations in the mouth to normal. We do not know much about these toxins, but the analysis of the urine tells us what the general condition of the system is.

Dr. Hopkins' query as to whether decay of the teeth is due to indicanuria *per se,* is prompted by an erroneous impression. I wanted to bring out in this paper that tooth-resistance is lessened from constitutional causes. That is why we have rapid decay of the teeth; at times pulp-degeneration and decalcification go on owing to want of resistance, which is due to systemic conditions. In working along these lines, I have come to firmly believe that these conditions are visible and can be examined, as Dr. Gray has mentioned. Dr. Gray's experience has been mine for a number of years, not only with my patients but also in my own condition.

I fully realize that one swallow does not make a summer, and I wish that somebody in this country or abroad would take up a similar line of research. It does not seem to me that much progress is being made, although I continue working year in and year out. I have brought this subject before the profession a number of times, and yet I do not know of anyone who has taken up this work. It is very simple, and it seems to me that students should be trained to find out whether my investigations are correct or not. It does not make any difference to me personally, because I am doing the best I can. What we need is more research work in our schools, and it is unfortunate that we have no laboratories in the schools well equipped for this work. It would not take long to find out whether this research work is correct or not, and I hope that the schools will do something along this line.

Dr. Kirk's remarks are rather confirmatory of my views than otherwise. I wish to congratulate him on the work which he is doing.

The next order of business was the reading of a paper by Dr. Clyde Davis, Lincoln, Nebr., entitled "A Method of Treatment of Purulent Empyema of the Maxillary Sinus."

The paper here follows:

A Method of Treatment of Purulent Empyema of the Maxillary Sinus.

By CLYDE DAVIS.

It is not the intention of the writer at this time to deal extensively with the etiology, semeiology, or diagnosis of this generally well-recognized disease, but in as brief a manner as possible to present to the profession a method of treatment which has proved unusually successful, and one which we believe has some new features as to the surgical procedure and the therapeutic means which will appeal to all as being more harmonious with the principles of surgery in general than the methods usually advocated.

Infection is introduced either through the normal communicating openings to

accessory cavities or through the dissolution of the continuity of its lining membrane.

By the first route the greater majority of cases is infected through the antra-nasal openings. Bacteria are first taken into the nasal cavity in the act of inhalation, and subsequently forced through the foramen by the pressure produced in blowing the nose. A favorable soil for their subsequent development is oftentimes found previously prepared by former irritation, or through the communication to the sinus of inflammatory changes in the Schneiderian membrane of the nasal cavity, which also lines the antra.

As to the penetration of the walls for infection, by far the most frequent causes are diseased conditions about the roots of the teeth.

As to the means of diagnosing the presence of pus in the maxillary sinus, we should place more reliance upon the reflection of light than upon any other one thing, yet being mindful of the symptoms usually considered pathognomonic. The effects of reflection are best obtained by putting the patient in a dark room and having him close his lips over a small electric light bulb. If the sinus in question be entirely or partially filled with any substance other than air, it will be dark and no light will be transmitted, whereas if it be normal a delicate pink light will outline the entire cavity.

After having decided that the sinus is diseased, the first thing of importance is to see that the antra-nasal opening is free, and if not, to surgically render it permanently open, for as long as the sinus exists as a cavity it must have permanent and sufficient drainage, healthy or otherwise, since even in a state of health the sinus and the communicating frontal and ethmoidal cavities must have an exit for their normal secretions. This is imperative, and there is no use in attempting to effect a cure with the hiatus closed, for this in itself will act as a cause for speedy recurrence as long as the cavity exists.

Having established the antra-nasal opening, the rhinologist many times will effect a cure by thorough irrigation through this opening, provided the infection has been communicated through the nose.

But frequently this is not the case, and a more thorough exploration and drainage is indicated, therefore we decide to make an external opening, which for cosmetic reasons we elect to make through the oral cavity. Unfortunately, this cavity is usually far from sterile, and proves a source of great danger from secondary infection. As soon as we have made a communicating opening we proceed to explore, locate the source of infection, if possible remove the exciting cause, and then look for a permanent healing and closure of the wound.

Just at this point the writer has many times recalled the story of the man who did not like his pastor's preaching, which was much on the order of "You will be damned if you *do,* and you will be damned if you *don't.*" If you close the oral opening, drainage ceases and the disease recurs. If you do not close the opening the case is not well. In other words, it is not well while open and it will not heal if closed.

To secure an antrum which is closed yet open, many schemes have been devised, such as drainage tubes, tampons, etc. It was right at this perplexing point that the writer conceived and tried

the following method, which has given excellent results with no failures, even in extensive incisions.

The first oral opening is generally exploratory and need be but small; it can be readily closed by the method indicated and it will suffice, should simple drainage and thorough irrigation be sufficient for resolution.

The lip is raised to its full height and a semilunar flap is cut through all the soft tissues, including the periosteum, with the unsevered part upward. With a periosteal scoop this flap is then dissected from the bone. Then, with a spear-shaped drill, pointing upward and backward, the bony wall is punctured and enlarged to about three-sixteenths of an inch in diameter. The sinus is then explored in every part with a flexible blunt short probe to assist in the diagnosis of the cause. If a more extended operation for the removal of foreign bodies, or curettage in cases of denuded walls—as in necrosis—is demanded, proceed to enlarge the opening by extending the cut in the soft tissues mesio-distally; dissect and remove the bony wall above the incision.

Having completed the operation indicated, proceed to irrigate all the soft tissues, and sterilize with the usual non-irritating antiseptics. Then fill the entire cavity with normal salt solution, and immediately approximate the soft tissues. Dismiss the patient without packing except in extensive operations and curettages, when the cavity should be entirely packed with a tape of gauze as an absorbent of capillary hemorrhage. As long as the incision remains open there is ample drainage and ample means of irrigation.

As soon as the soft tissues close—and the sooner the better—irrigate by means of a hypodermic syringe, puncturing the soft tissues each time in a new place, previously sterilized. The bony wall will be slow in re-forming; days in small openings, and sometimes weeks in large openings, will intervene between the closing of the soft tissues and the bony lesion, during which time the sinus is closed to infection from the oral cavity, yet open to the hypodermic needle for irrigation. Should the bone close sooner than desired, the soft tissues may be punctured with an instrument such as a sterile excavator, and by a twisting motion the callus may be broken up and the previous conditions for treatment prolonged for ten days or two weeks. By this means the writer has been able to easily pass over a very critical time in antrum treatment, and effect permanent closures in cases that had persistently recurred just at the time when final closure had taken place, due to the inclusion of infectious matter within the cavity.

As to the normal salt solution: Most antiseptic solutions, as is well known, are very irritating to the highly sensitive Schneiderian membrane. Again, one of the best home treatments for nasal catarrh is a spray with salt solution. By these facts the writer was induced to flood an antrum, just before dismissing the patient, with the normal salt solution. The result was so gratifying that all cases are now so treated, resulting in materially shortening the course of treatment, and increasing the percentage of permanent cures.

Discussion.

Dr. L. D. Archinard, New Orleans, La. I must preface my remarks by thanking the essayist for a copy of his

paper, which, unfortunately, was received only on the eve of my departure for this meeting.

This subject—the treatment of empyema of the maxillary sinus—is of great interest both to the dentist and the rhinologist, and in recent years, in my humble opinion, is rapidly passing over to the field of rhinology.

No advanced worker in the combined fields of stomatology and rhinology has failed to reach the conclusion that diseases of the antrum are either of dental or nasal origin. Both factors can and do come into play. The widely known fact that the upper second bicuspid and the first and second molars may present the anomaly of their roots actually projecting into the antrum renders such an association in the etiology of antrum affections all the more possible. But I am transgressing, as the author of the paper well says "It is not my intention to deal with the etiology or diagnosis, but simply to present a method of treatment which has proved unusually successful." I fully agree with the essayist when he states that external opening through the oral cavity is fraught with great danger from secondary infection, due to the usually unsterile condition of this cavity. This method of irrigating with hypodermic needle after the closing of the soft tissues strongly appeals to me. The *modus operandi* of treatment described by him, although I have never tried it, seems pregnant with good results, and, I believe with him, will appeal to all as being more harmonious with the principles of surgery than those usually advocated.

Dr. J. P. Gray, Nashville, Tenn. I desire to say that my discussion of the paper must of necessity be short, as I received it only a couple of days before leaving home, and I therefore did not have time to give it such careful study as I should like to have done, and must rely largely upon an oral discussion instead of a written one, as is required in discussing these papers.

Dr. Davis has presented to us a good paper, and I agree with him in some particulars.

He did not go into the discussion of the diagnosis of the case to such an extent as he should. He gives no consideration whatever to the condition of the face, or of the bones surrounding the cavity. He has dwelt largely upon the treatment, and states that it is only with the treatment that he is dealing. He speaks of the diagnosis in a short paragraph, and says that we can determine the conditions, or determine whether there is any pus formation.

My opinion is that a thorough diagnosis should be made before any treatment is undertaken. It has been my observation that a majority of these cases are brought about by arrest of development of the maxillary and of the bones surrounding the cavity. Where we find an arrest of development we are likely to find conditions that do not exist in the ordinary normal case.

Even the rhinologist does not take into consideration the fact that there has been an arrest of development in the nasal cavity as well as in the bones surrounding the maxillary sinus. To my mind, it is a well-established fact that where we have an arrest of development of the nasal bones and of the bones surrounding the antrum, the antra-nasal openings are very frequently closed.

The essayist mentions the fact that we are likely to have, and frequently do have, trouble produced by the teeth. If we examine the bones carefully, we will find that in the arrest of development the

bones have grown thinner, and that the cavity is crowded upon itself; the teeth have not been arrested in the same proportion as the bones surrounding the cavity lying next to the alveolar process and therefore penetrating the latter.

Upon the most difficult part of the treatment the essayist has not touched. He states that his method is to penetrate the bone above the alveolar process, and drain the antrum. This opening is sufficiently large to allow the exploration of the cavity. Now, in most of the cases which I have observed by dissection, I find that there are many divisions of the bone, and these would be hard to explore. These divisions or lobes are of such a character that they will not drain from one to another, and as a result the operator cannot find them; they are overlooked in passing the probe into the cavity. The operator should therefore produce an opening large enough to allow perfect exploration. Should these divisions be of such a character that if one of the lobes be drained the other is overlooked, then the latter division would not drain until it is sufficiently filled with pus, which passes over into the other lobe, and so on. I have found as many as four of these divisions; it would have been impossible for the operator to drain all the lobes, even using the lowest point in the antrum, and if he knew where the lowest point was located.

The essayist's treatment would possibly be all right, and the disease would yield readily, if he had a normal cavity to deal with, but in the majority of these cases it would not be applicable.

If we were able to dissect the bones of this cavity and of the frontal sinus, we should find in the formation of the bone that at some period there had been an arrest of development, and as a consequence a greater effort would be required than he has put forth in his paper. Since not all cases are normal, he must go further in the treatment, and curette if necessary.

I have found in some of these cavities little top-like pockets, with the small end of the top pointing downward.

I do not know whether I make myself clear or not, but if you make dissections you will in many skulls find these pus pockets.

In nearly all cases you will find a depressed condition of the malar bone, an abnormal formation of the maxillary, and a compression of the nasal bones, as a result the bone is often twisted and a tortuous canal is present rather than a normally rounded cell.

Dr. J. E. Power, Providence, R. I. I first wish to express my appreciation of the paper and say that I agree with nearly everything that the essayist has said. In connection with the irrigation of the antrum by means of the hypodermic syringe, I fail to see how he brings about that irrigation. I do some oral surgical work myself, and it seems to me that we would need a specially constructed syringe with a large barrel, to carry a sufficient amount of medicament into the antrum. If you use a syringe seven or eight times, and make seven or eight insertions, it seems that there would be a greater probability of infection from the greater number of perforations than were the opening left open.

The other gentlemen described some abnormal cases. In my experience with cases of diseased antra, if the disease does not yield to treatment in a reasonable period of time, I resort to curettage of the antrum. I believe that in this work a sufficiently large hole should be made

to allow the operator to see what he is doing, otherwise he is wasting time, and it is my experience that the dentist seldom makes an opening large enough to see what he is doing. I make it a rule, if a case does not promptly respond to treatment, to make an opening large enough to allow the insertion of a medium-sized curette, and scrape the walls thoroughly. The only disagreeable feature of this method of procedure is the hemorrhage. Yet I question very much whether the patient experiences much more discomfort from that method than from the constant irritation of the insertion of the syringe and the daily irrigation.

Dr. E. S. Talbot, Chicago, Ill. I simply wish to confirm the remarks made by Dr. Gray. I have given considerable attention to this subject and I have recorded the examination of many thousand skulls, showing that these partitions are very common in cases of arrested development of the face, which of course involves the antrum. These partitions are never fully formed. There is always an opening through the partition from one space to another at the upper border. I have seen three or four of these partitions in one antrum, and therefore, in the few cases which I have treated, after making an opening from the nose into the antrum, I have invariably placed the patient in a recumbent position on the abdomen, with his head down, so that the secretions could pass out. Dr. Gray's experience and my own would lead me to believe that the treatment recommended by the essayist is not entirely proper, simply because I doubt whether he can obtain results. He may in some cases, but as a rule I do not think that it would be well to adopt his method of treatment.

Dr. Davis (closing the discussion). As I stated in the paper, it was not my intention to go into the technique of the surgery of this operation. I fully agree with Dr. Gray as to finding cribriform processes in the antrum which divide the antrum into different cavities, and I merely alluded to that when I said that there are cases which demand curetting. We do find such cases, but I passed hurriedly over the surgical part of it. I did not state where or how you should go into the sinus, except at the time of final closure of the opening.

As to the cribriform processes which divide the antrum into cavities in antrum disease, it is necessary to break those down, and curette the entire cavity. Reference has been made to drainage. All that is necessary to obtain complete drainage through the proper opening is to pass a small spoon-shaped curette to the most distant portion of the antrum, and after inverting, to drag it out until it comes out at the opening. You will thus be able to break down these processes and secure perfect drainage there.

The quantity of fluid to be forced into the antrum depends on what is back of the hypodermic needle. If you only wish to put in a small quantity, the ordinary sized needle is all that is necessary, but if you wish to irrigate thoroughly, you will have to use a larger barrel. You can also apply a continuous pump behind the hypodermic needle, or take a small tube attached to a water-bottle and slip it over the needle. I did not go into the details of this procedure. What I wished to suggest was that when the antrum comes to close after it has been treated, instead of inserting a tube and allowing it to remain, we should try to induce the soft tissues to close as soon as possible, in order to shut out infection

from the nasal cavity; by then penetrating the antrum in different directions, we are able to irrigate the cavity and place it in an antiseptic condition, and not subject it to the infection that comes from the mouth in using tampons.

The next order of business was the reading of a paper by Dr. THOMAS B. HARTZELL, Minneapolis, Minn., on "Root-Tip Amputation and External Drainage for Dental Abscesses," as follows:

Root-Tip Amputation and External Drainage for Dental Abscesses.

By THOMAS B. HARTZELL.

ABSCESSED teeth are a cause of great distress in the average dental practice to both dentist and patient; to the patient because of the intense pain in acute cases and the tedious treatment in chronic cases; to the dentist because of the frequent failures necessitating a loss of teeth.

Time and experience have taught to surgeons that the safest rule to follow in pus infections is to evacuate the pus early, and to provide free drainage by keeping the wound open so that it must build in from the bottom, permitting the surface to heal last. When an infection is managed in this fashion, success is reasonably certain.

This is just as true of the dental abscess as of any other form of pus infection; but to accomplish a cure is far less easy in dental than in most other forms of abscess, for two or three reasons. The focus is deep and correspondingly difficult to reach, and the drainage is difficult to maintain, because the mucous membrane grows fast, thus shutting off the drainage. To succeed in this work, make the root-canal of the affected tooth as nearly sterile as possible, and fill it with chloro-percha and gutta-percha points. This having been done, inject the tissue over the end of the abscessed root with a three per cent. solution of alypin, and wait three minutes for the alypin to accomplish thorough anesthesia. Alypin is non-poisonous and non-astringent, and the tissues heal more readily after its use than after the application of any other local anesthetic I have ever used.

After the anesthesia is perfect, with a trephine take out a button of soft tissue as large as you can without interfering with the roots of adjoining teeth. Then, with series of pear-shaped burs ranging from No. 5 to No. 10, penetrate the bone to the root-end, burring off the root-end sufficiently to obliterate all evidences of infection and leaving a clean oval or round hole in the tissues. Then wash out the débris and pack the wound with cotton or gauze saturated in sandarac varnish, wedging the surface of the wound open while lightly packing its bottom. Allow this dressing to remain long enough to permit the formation of a good layer of granulation tissue. This requires from twenty-four to forty-eight hours. You will note that your dressing when removed is hard, although when being placed in the wound it was soft and easy of introduction, thus forming

the most ideal substance for dressing any form of abscess where the surface tends to heal faster than the bottom of the wound. The lack of this quality in the ordinary gauze or cotton dressing, permitting wounds of this character to heal on the surface readily, thus covering the infected area before nature has had time to build in scar tissue, is the most common cause of failure in these cases, and can be entirely overcome by saturating the dressing with ordinary sandarac varnish.

This operation is comparatively simple, and if the sandarac dressings are persisted in till the wound is thoroughly healed from the bottom outward, is a most satisfactory one, as you may judge from my percentage of failures, which is a trifle less than seven per cent. in three hundred and fifty-one cases treated in this way. These figures do not include root-amputations in teeth affected with pyorrhea, but refer only to that class of dental abscess in which root-canal drainage proved useless.

This completed the work of Section III, and the chairman, Dr. McMillen, declared the section adjourned *sine die*.

THE CLINICS.

Dr. W. S. Payson, Castine, Me. "Anchorage of Alloy Fillings."

A method was demonstrated of anchoring alloy fillings in badly decayed teeth and conserving the maximum amount of tooth-substance by using a double-headed brass gold-plated rivet, letting one head of the rivet rest in the narrow anchorage and the other head in the mass of the filling, the rivet preventing the smaller part of the filling or anchorage from breaking away. The sulcus usually used for anchorage is cut away just as little as possible, after the caries has been removed, and room is thus made slightly larger than the rivet.

Dr. C. Edson Abbott, Franklin, Mass. "Gold or Amalgam Fillings Inserted on Soft Cement, Burnished under a Cloth Strip."

There are many occasions where it is desirable to insert metal fillings over soft cement, to perfectly seal the cavity, to preserve the color of the teeth, to save thermal shock, to retain the filling and to sustain the tooth. After the cavity is prepared, a thin layer of some soft sticky cement is placed over the cavity. The annealed cohesive gold foil or fiber gold or amalgam, as indicated, is placed over the whole extent of the cavity, a fresh strip of cotton or linen tape is held over the whole cavity, as in taking a matrix for a porcelain inlay, and the whole metallic filling is burnished to an accurate adaptation with the cavity wall. The cloth strip is removed. In the case of a gold filling, after the cement has hardened, gold is added to nearly complete the contour. Then the margins are cleared of cement, and more gold is burnished on to complete the contour.

In case of an amalgam filling, the cement is removed from the margins and more amalgam is added at once, using a matrix in most approximal cavities, and the filling is completed.

Drs. V. M. Rundle, Newton, N. J., and Horace I. Beemer, Newton, N. J. "Gold Filling."

The clinics of Drs. Rundle and Beemer consisted of Dr. Rundle preparing on the

first day a cavity on the mesio-occlusal surface of an upper left molar and making a gold filling in this tooth according to the methods of Dr. G. V. Black; the following day Dr. Beemer prepared and filled by the same methods a cavity in the disto-occlusal surface of the upper left second bicuspid in the same patient as Dr. Rundle had operated on the previous day, thus bringing two of these fillings approximating each other, and showing the advantages of Dr. Black's methods to the fullest extent, and bringing out with special emphasis the restored interproximal space and the small rounded contact point.

The cavity margins were extended buccally, lingually, and gingivally into areas of comparative immunity from decay. The cavities were made with the occlusal step-anchorage, flat gingival and occlusal seats, and parallel walls. No undercuts or pits were made as aids for retaining the filling, but the general box-like shape of the cavity and thorough condensation of the filling material were depended upon for retention.

This form of preparation makes every part of the cavity readily accessible, so that the filling may be made with a single plugger. Dr. Black's and Dr. Wedelstaedt's special cutting instruments were used in preparing the cavities.

The gingival third of the cavity was filled with unannealed gold, by placing a cylinder in each of the gingival angles and a third cylinder between them, securely keying the whole mass into place. The remainder of the filling was made with annealed gold. The gold was specially rolled into cylinders and pellets of definite sizes from No. 4 unannealed gold foil, in the manner taught by Dr. Black.

For condensing the gold a hand mallet was used by a trained assistant, giving a blow of about ten pounds, and the force of the blow was augmented by hand pressure of from twelve to fifteen pounds, thus insuring thorough condensation, and the gold during the process of building was malleted firmly against the approximating surface of the adjacent tooth at the point where approximal contact was to be made on the finished filling.

The excess of gold in the interproximal space was removed with a Black saw, and the filling trimmed to form with Wedelstaedt interproximal trimmers and Black knives, careful attention being paid during this trimming not to disturb the approximal contact, after which the whole filling was given a final polish, following Dr. Black's method throughout the whole procedure.

Dr. Gilbert M. Griswold, Hartford, Conn. "The Burnished 'Co-Ad' Filling."

Prepare the cavity and its margins, as your judgment indicates, avoiding retaining pits and deep grooves as usually made with an inverted cone bur. Make undercuts with round or oval burs and as shallow as would be sufficient to retain the gold without the use of cement, experience having taught not to depend wholly upon the adhesive property of the cement, although in many cases it would be sufficient. Select instruments with polished surfaces adapted to the size, shape, and location of the cavity. In starting the filling use as large a point as you conveniently can, and one adapted

to the undercut of the cavity—it spreads the gold more smoothly and there is less of the "evening up" process later on. Place your fiber gold upon the annealer, cut or tear it into pieces of various sizes —none large—also your cylinders and rolled gold if you choose those. Turn on the current, and the gold will be heated by the time the cement is ready. In selecting a cement for lining the cavity take one that is "sticky" when mixed thin enough to quickly and smoothly flow over the floor and walls of the cavity.

Mix the cement quickly but thoroughly, carrying it to the cavity before it really begins to set; a double-end bayonet-shaped amalgam instrument No. 2 of E. J. Ladmore's set is good for the majority of cavities, using of course the larger or smaller end according to the cavity. Do not use a steel spatula in mixing the cement, as it is very liable to leave a stain that will show through the enamel walls, especially if the walls are thin. If you have succeeded in quickly placing the cement in the cavity wait a few seconds for it to begin to set, then carry the fiber gold to place, pressing it well into the groove, and if necessary holding it with a fine point while you pack other pieces, so that the attachment with the cement may not be disturbed or broken, until the floor and walls of the cavity are well covered. Sometimes after having covered the cavity with fiber gold it is well to wait a very short time to be sure that the cement is well hardened before continuing the filling; but usually the heat from the gold and burnisher has hastened the setting sufficiently to prevent any delay.

After removing any overlapping cement, and making sure that the margins are free from it, the filling can be continued, using fiber gold or cylinders or both. I have found it of advantage to use both, as the cohesive property of the fiber gold seems to be greater than that of the foil, and if for any reason the foil does not unite, place in a piece of fiber gold, and cohesion will usually be re-established. After the first layer or two of fiber gold, cylinders or foil in any preferred form are largely used, as they burnish to place more smoothly, and I believe more solidly; in the "leveling up" process, however, fiber gold spreads more readily and is of great advantage. I like foil, especially for the surface, and in many cases a layer of rolled gold works beautifully and leaves a fine surface. . . . In placing the pieces of gold, first press them gently to place before burnishing. This saves dragging and displacement before the attachment is made. Burnish each piece. This is of the greatest importance, as a dense filling cannot be made if several pieces are placed before burnishing. Trim and polish in the usual way. It is the opinion of the clinician that the secret of success lies wholly in the annealing of the gold and in the proper application of the required degree of heat.

We do not give as much credit to the blued burnisher as some do, for although a burnisher nicely blued and highly polished by a skilful instrument-maker affords a great deal of satisfaction, a highly polished instrument that has not been blued will accomplish the same results. But an electric annealer is necessary in order to guarantee the best results. If an electric current is not obtainable, anneal the gold on a sheet of mica.

Some of the points in favor of inserting a filling by this method are:

(1) We believe it to secure a thor-

oughly tight filling, and one which better supports the walls of a cavity, in many cases lessening the need of "extension for prevention."

(2) It gives a very firm filling, as it adheres to the walls as well as being retained mechanically.

(3) It gives a very dense filling, as none but polished surfaces are used in condensing the gold.

(4) The insertion of the filling is much easier for the patient, as the mallet is not necessary.

(5) It is also much easier for the operator, as there is no chance for "rocking" and much less strain upon the eyes, as larger points can be used.

(6) It is a saver of time, although it requires quite as much thoroughness as any other filling.

(7) It is more compatible with tooth-structure, causing less thermal irritation.

In closing, I would say that for the last three years we have almost wholly used the method described; in fact, we have had occasion to use the mallet but little during that period of time, and in many cases only to test the density of certain fillings and to be more thoroughly convinced that a solid filling was produced. We are more and more realizing the great relief which is afforded to the patient by being freed from the blows of the mallet, and the consequent satisfaction to the operator. During these three years we have had opportunity to observe many of the fillings inserted by this method, and we are more and more convinced that it is an excellent one.

As we so largely depend upon the cohesive properties of the gold in this method of filling, and as we make an adhesive filling by the use of the cement, it is suggested that we term it the "co-ad" method of filling.

Dr. H. DeWitt Cross, Boston, Mass. "Anatomical Articulation."

The characteristics and essentials of anatomical articulation are merely the copying of a normal set of natural teeth, not anything which man has invented; he has only applied nature's principles. These principles apply with equal advantage to the shaping of occlusal surfaces of fillings, to the position of teeth which have been regulated, to crowns and bridges, and to removable dentures, in regard to their articulating or antagonizing bite.

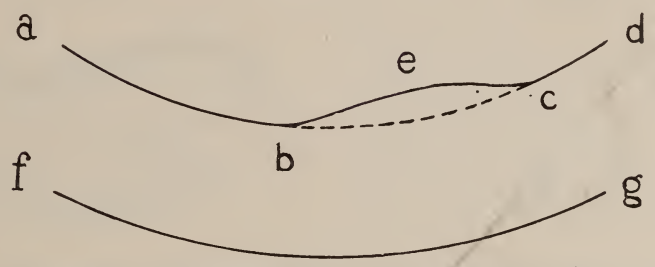
Assuming a correct bite, three things are necessary in order that teeth may be arranged to antagonize correctly: (1) An articulator capable of reproducing the movements of the mandible, and susceptible to the necessary adjustment for individual cases—the anatomical articulator. (2) A means of obtaining the correct relation of the models to the condyle of the articulator—the face-bow. (3) A method of adjusting the angle of the condyle path on the articulator to correspond to the individual angles of the path—the protruding bite. (Fig. 4.)

The compensating curve. The compensating curve (Fig. 1) is double, and is made up of a fundamental and a secondary curve. The fundamental curve compensates for the direct forward or protruding bite, while the secondary curve compensates for the cornerwise or condyle-to-canine movements of the mandible, the chief movement of mastication. The condyle path and the fundamental curve are arcs from a common center,

but not necessarily of the same radius. It is because of this center that the curve

the overbite the secondary curve is less marked in the lower teeth.

FIG. 1.

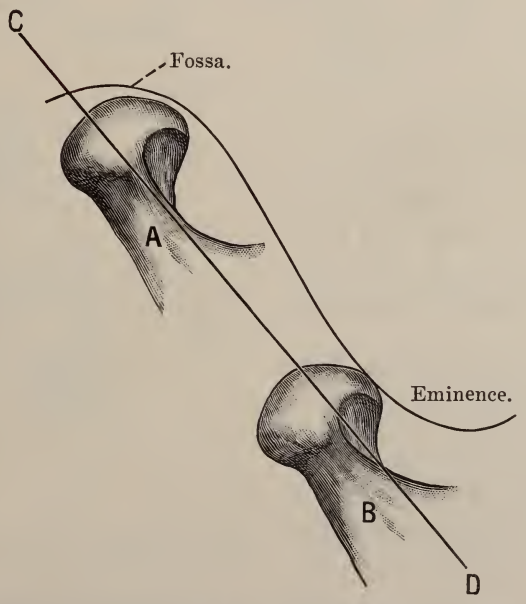


a b c d, Fundamental compensating curve. b e c, Secondary curve. a b e c d, True compensating curve. f g, Curve of lower teeth.

compensates for the downward motion of the condyle, teeth and condyle rolling

The compensating curve is in direct relation to the angle of the condyle path,

FIG. 2.



A, Condyle in fossa. B, Condyle forward on eminence. C D, Line of condyle path. This line makes, with the plane of occlusion, the angle of the condyle path.

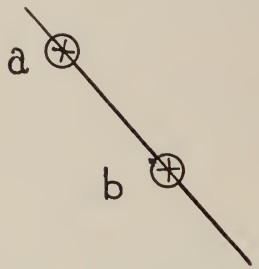
together about the common center. The secondary curve embraces the lateral, canine, and bicuspids. On account of

i.e. a greater angle means a greater compensating curve, and *vice versa.*

The length of the cusps of the bicus-

pids and molars stands in direct relation to the overbite or cusp of the incisors. (See Fig. 9, on page 216.)

Fig. 3.



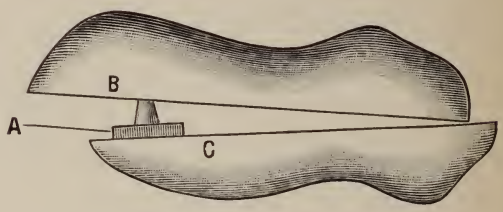
a, Position of condyle in socket as located by the face-bow. b, Position of condyle when the protruding bite is taken. (The slot of the articulator connecting these two points makes all movements of the articulator jaw follow this line.)

The condyle path. The condyle path (Fig. 2, C and D) is the line of motion taken by the condyle as it moves forward and downward from its position in the fossa on to the eminence. This direction, while really constituting an arc, may be considered a straight line, as it is so short. This line, considered in relation to the plane of occlusion, is called the angle of the condyle path, which may vary from a very small angle up to one of 50°.

The determining and adjusting of the articulator to this angle is done by means of the protruding bite, with the lower jaw thrust forward as far as possible, *after* the models have been attached to the articulator in their proper position by the use of the face-bow. (See Fig. 3.)

The angle. The angle is determined by first locating the forward position of the condyle, and as the back position has already been set by means of the face-bow, the condyle path must be in a line between these two points. (Fig. 3.) This path is represented on the articulator by the slot. It is possible to take the protruding bite by adding a little

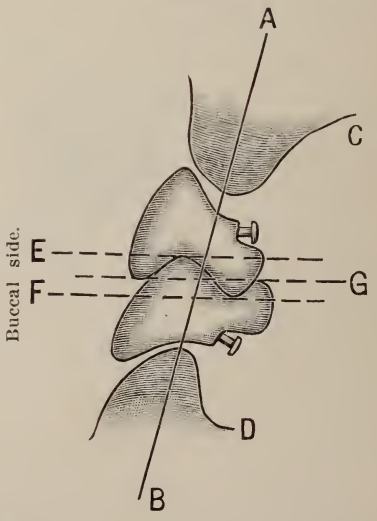
Fig. 4.



A, Bite-gage in position between wax bite-plates B and C as used in taking the protruding bite.

more wax between the heels of the plates and scoring them, just as is done when

Fig. 5.



Shows occlusion, slant, and interlocking cusps. A B, Long axis of teeth arranged between centers of upper and lower ridges, C D. E F, Show difference in height of buccal and lingual cusps.

taking the original bite, but the little bite-gages are more convenient, as they not only fill up any space but main-

tain the relations of the plates as well. Should the wax bite-plates be trimmed to nearly the right curve, there will be no space between the heels, but the condyle position will be obtained just as accurately. (See Fig. 4.)

DIRECTIONS FOR SETTING UP TEETH FOR ANATOMICAL ARTICULATION.

Select long-bite teeth, with a large occlusal surface on the bicuspids and molars. Grind square fissures in the bicuspids and molars with a carborundum lathe stone 3 in. x ¼ in. thick, grit B.

Set up, in a full upper and lower denture, all of the upper teeth first, producing the compensating curve; perpendicular bicuspids; the molars—especially the second—slanting (Fig. 5) with their long axes directed to the center of the lower ridge; set the second bicuspids and molars with the lower wax plate removed from the model. The compensating curve is determined by the curve of the lower ridge, or the lower teeth and the angle of the slot in the articulator.

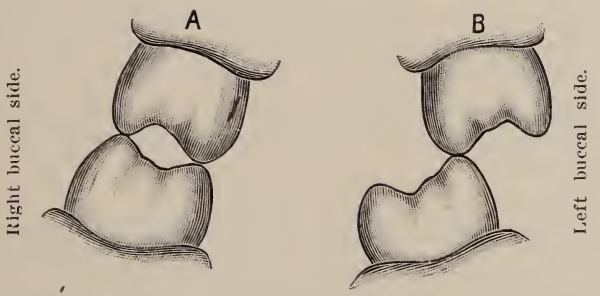
Begin to set up the lower teeth with the second bicuspid, as it is the only tooth occluding between teeth of similar size and cusps; also in order that the occlusion may not be disturbed by the anterior lower teeth being made too wide, which would be the case if the incisors were set up first.

Place the lower second bicuspids in the following manner: First, for appearance, slanting lingually; second, for occlusion, grinding if necessary; and third, for articulation—or the antagonizing bite. To get this bite the lower frame of the articulator is moved to one side, until the buccal cusps of the upper and lower teeth are flush. (Fig. 6, A.) It will usually be necessary to grind the buccal cusp of the lower bicuspid.

After one second bicuspid has been set up in this way, place the opposite one in the same manner, and follow alternately with the four molars, being sure of the articulation of each as you proceed.

Lastly, put in place the lower anterior teeth, grinding them narrower or overlapping, as may be necessary. The incisors should be placed directly on the

FIG. 6.



Transverse section of right and left molars. A, Contact of buccal and lingual cusps, or the antagonizing bite on the masticating side. All the molars and bicuspids on this side have this contact. B, Contact of lingual and buccal cusps on the balancing side. This is only for the lower second molar and upper first molar. The others do not touch on this side.

top of the ridge, and sufficient front and overbite must be allowed.

If the teeth have been ground and placed as directed, there will be contact of every buccal and every lingual cusp on the side toward which the mandible is moved (Fig. 6, A)—the masticating side—while on the opposite or balancing one there will be only one point of contact, the buccal cusp of the lower second molar with the palatal of the upper first. (Fig. 6, B.) One masticates on but one side at a time when using the lateral antagonizing bite. (Figs. 7, 8.)

FIG. 7.

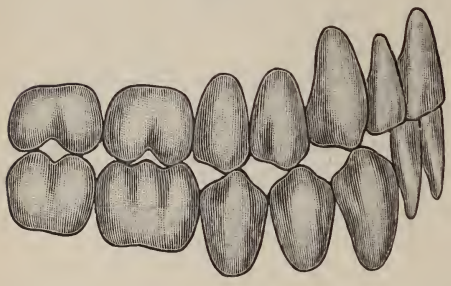


FIG. 8.

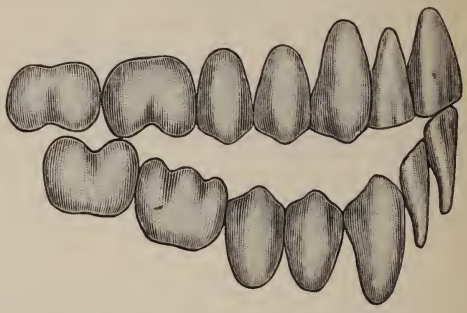


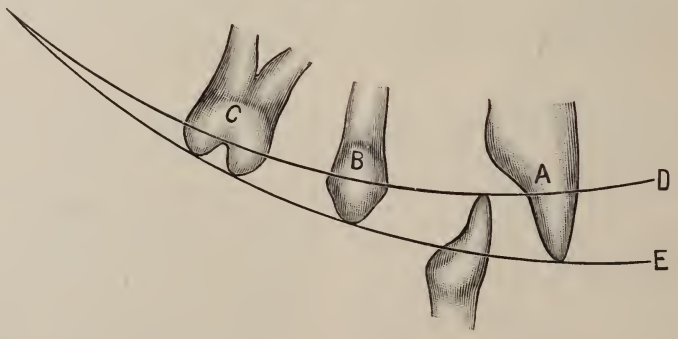
FIG. 7: Masticating side, with every buccal and lingual cusp in contact with its opposite. The condyle is in its socket, but rotated. This position of cusps corresponds to Fig. 2, A.

FIG. 8: Balancing side with contact of incisors and molars only. The condyle is in its forward position on the eminence. This position corresponds to Fig. 2, B.

Teeth set up in this way do not tilt or trip in any position into which they may be brought during the movements of mastication, in spite of the fact that they have deep fissures, sharp cusps, and a decided overbite.

Provided the plates fit well, one can masticate meat with teeth arranged as

FIG. 9.



Shows decreasing length of cusps from incisors to molars. A, Overbite, or cusps of incisors. B, Shorter cusp of bicuspid. C, Still shorter cusps of molars, shown by lines D E.

described as easily and quickly as with natural teeth.

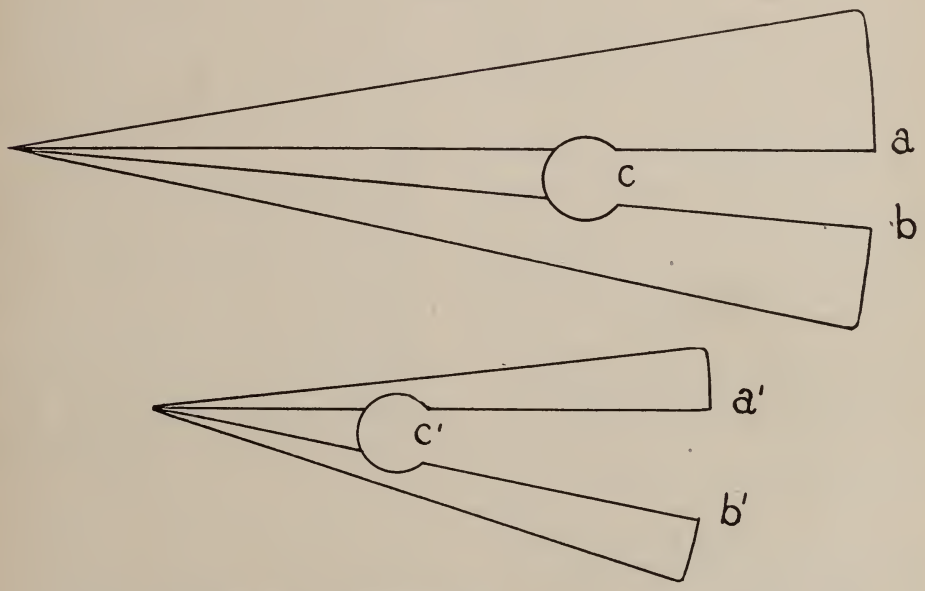
Crowns, roots, and facings will not be broken; fillings restoring cusps will not be loosened, and teeth whose position has been changed by regulating will not be driven back, or almost totally prevent the proper masticating movements, if they are anatomically adjusted to the antagonizing bite.

The overbite. The overbite is normally about one-eighth of an inch, and it determines the length of the cusps of the bicuspids and molars, gradually shortening to nothing at the condyle. It is very important to graduate the length of the cusps and the depth of the fissures, otherwise it is impossible to obtain both the occlusion and the articulating bites. (Fig. 9.)

As the overbite is increased from an edge-to-edge bite, it is necessary to increase proportionately the front bite—or the horizontal distance between the incisors—otherwise tilting will occur during the incising bite.

The occlusal bite is the old back bite which everyone tries to obtain. The active antagonizing bite may be said to consist of three positions (there being an indefinite number of intermediate ones), namely, the right lateral, the left lateral, and the incising, and there is always a balancing antagonizing or passive bite on the opposite side. These are the bites which are employed during mastication.

Fig. 10.



a b, Bite opened on a plain-line articulator. c, Space occupied by the molars, which equals c′, representing the space in the mouth. a′ b′, Shows increased space in the mouth, and failure of the incisors to meet.

Directions for the Use of the Face-bow and for Setting the Angle of the Condyle Path.

(1) Take the bite in correct manner.

(2) Locate the condyles of the patient's mandible.

(3) Adjust the sliding rods of the face-

bow equidistant from the ends of the bow to fit snugly against the skin over the outer face of the condyles.

(4) Insert the heated fork of the face-bow firmly anywhere in the anterior surface of the wax.

(5) Place the wax plates, fastened together if possible, in the mouth, directing the patient to bite firmly.

(6) Slip the head of the face-bow over the fork rod and carry first one and then the other sliding-rod-head to its position over the condyle; then, holding the bow firmly, tighten the set-screw in the head, over the fork-rod.

(7) Loosen the sliding rods and remove the wax plates, fork, and bow.

(8) Press the sliding rods in as far as they will go and lock them. The rods will now fit the condyles of the articulator. Set the bite-screw in the usual way, and have the spring controlling the forward movements of the articulator in tension, and, being sure that the four set-screws holding the bows are tightened by means of pliers, proceed to attach the models in the usual manner.

(9) Remove the face-bow and fork.

(10) Take the wax plates off the models, and warm and press the bite-gages into the lower plate in the molar region.

(11) Insert the wax plates in the mouth and take the protruding bite. The bite-gages fill up any space and maintain the proper position of the plates.

(12) Release the spring and loosen the set-screws which hold the slot-pieces in position so that there is an absolutely free movement of the condyles, not only as a hinge, but also around a radius of half an inch. It is necessary that these slot-pieces move freely.

(13) Place the wax plates, just as they were removed from the mouth, on the models, and gently but firmly press the models into the wax plates, allowing the condyles to assume their position, guided wholly by the wax bite-plates.

(14) While holding the models into the wax plates tighten the slot set-screws, remove the bite-gages, and attach the spring, which returns the articulator and the models to the original bite position.

The models which were mounted by means of the face-bow are in exactly the same relation to the hinge of the articulator as existed between the ridges in the mouth and the condyles of the mandible; and by means of the protruding bite the angle of the condyle path was set on the articulator for each side to correspond to the angle of the jaw, so that with these adjustments the articulator accurately reproduces all of the movements of the mandible, and it is possible to change, open, or close the bite on the articulator without altering its relations when the teeth are placed in the mouth.

The teeth may now be set up, and the occlusion, if taken correctly, and the articulation or antagonizing bite, will be exactly the same in the mouth as on the articulator.

[The foregoing principles of anatomical articulation, including the use of the face-bow, attaching the models to the articulator, taking the protruding bite, and adjusting the articulator to the proper angle, grinding and setting up the teeth and the anatomical application to crown and bridge work, were illustrated by means of two sets of schematic jaws, two articulated models of natural teeth, two articulated sets of artificial teeth, articulated models, including bridges and two crowns, a technic head, a face-bow, four anatomical articulators, a model illustrating the effect of the opening of the bite on a plain-line articulator, and various diagrams.]

Dr. C. Edson Abbott, Franklin, Mass. "Alcohol and Asbestos Investment."

This is an investment for holding during soldering small bridges, Richmond crowns, orthodontia apparatus, gold inlay matrices, posts and caps, etc.

The pieces to be soldered are waxed together as usual, whiting in water being painted on the facings and where solder is not desired, and invested in alcohol and long-fiber asbestos as supplied by hardware stores or plumbing establishments, the whole resting on a small tray of nickel or platinum. A match is touched to the alcohol, and when it is entirely burnt off powdered borax is sprinkled on the joints and the case is ready for soldering. By this method all moisture and wax is burned off, and the parts are held accurately. The porous investment allows the blowpipe flame to heat up the case quickly from underneath. Being equally heated the solder flows like water to a perfect rounded contour. The case is allowed to stand until it is cold. This method produces ideal results, with a great saving of time in waiting, in soldering, and in finishing, with no cracked facings.

Dr. N. A. Stanley, New Bedford, Mass. "Treatment of a Case of Pyorrhea by Using the Carr Instruments."

Dr. Stanley operated upon a practical case of pyorrhea, a few of the teeth having been previously treated, and clearly showed the results to be obtained from this first and most essential step in the treatment of pyorrhea, viz, a thorough scaling.

Dr. W. H. Mitchell, Bayonne, N. J. "Vibration and Dental Massage."

By means of a simple device and of a few special instruments, Dr. Mitchell demonstrated on a patient his method of utilizing the benefits of vibration and massage treatment in dental troubles where such treatment is advised or where it would prove beneficial.

A small metallic disk out of balance is placed in the handpiece of the dental engine, and the handpiece is held well back and firmly in the hand by a strap passing over the back of the hand. This leaves the hand and the fingers free, while the engine imparts a high degree of vibration to the hand itself. A series of small rubber terminals is mounted on disk mandrels bent at right angles for convenience and used in the engine bit-holder. The fingers being free, the hand can be employed in the use of any instrument, but at the same time the hand being in vibration imparts that vibration to the instrument and to the part under treatment.

Although small and especially adapted for use inside the mouth, this imparts, if necessary, as heavy a vibration as the large machines used for general massage treatment.

Dr. Mitchell reports good results in his own practice for the past two years. By the stimulation and re-establishment of arterial and lymphatic circulation, both in the face and in the mouth, he has been able to arrest many cases of threatening alveolar abscess, and to hasten a cure even after pus had formed. The massage treatment is of great value if the tissues are so sensitive that they cannot be touched by the hand. The hand by means of vibration can gently massage the tissues without causing pain to the patient.

This method can also be used as an after-treatment in cases of pyorrhea; the gum tissue soon becomes firm and healthy. It is especially indicated in bleeding of the gums following the use of the tooth-brush by the patient. Three treat-

ments of from ten to fifteen minutes' duration generally effect a cure, especially if the patient makes daily use of the rubber tooth-brush after having applied the standard brush.

As for the literature on this subject, an able but long-forgotten paper of the late Dr. Wm. H. Rehfuss has been published in the *International Dental Journal,* another one by Dr. H. J. Allen in the *Dental Cosmos* for March 1907, p. 305; another by Dr. A. W. Harlan in the same number of the *Cosmos,* p. 281, and one by the author himself in the *Dental Brief* for April 1908, p. 204.

The clinician presents to the profession a simple device that enables any practitioner to utilize any type of dental engine for giving his patients the benefits to be derived from this modern and approved treatment.

Dr. Wm. E. Chenery, Boston, Mass. "Oral Surgery."

Of late years much attention has been given to mouth-breathing. Its effects have been studied not only by the rhinologist but by the dentist, and it has been justly found to be the wide-open door to many diseases.

To the dentist, persistent mouth-breathing means in adolescence deformed dental arch and irregular teeth, the opportunity of harboring multitudes of bacteria favoring the people's disease—dental caries—and inviting tuberculosis and gastric disorders.

The rhinologist thinks of the perverted air-current and its bad effects. The inspired air in passing through the normal nose is strained from dust and bacteria, is warmed and moistened, and after having been thus purified is prepared for entering the trachea and lungs without causing irritation. This is very imperfectly done when the air passes through the mouth. Persistent mouth-breathing causes dulled sense of smell and taste, interference with hearing and often deafness, changes in the quality of the voice, and frequently catarrhal conditions. Lack of drainage and ventilation of the nose also means increased irritation, and opportunity for infection. There is also interference with proper oxygenation. In fact, good health and facial beauty demand a normal nose rightly used at all times.

The most frequent causes of mouth-breathing are as follows: (1) adenoids, (2) enlarged tonsils, (3) deviated septa, (4) hypertrophied turbinates, and (5) polypi; and we should always remember habit as a cause, if these obstructions have been removed. I believe all dentists should have a good working knowledge of these conditions, and a closer relationship between dentist and rhinologist is desirable. Today we shall consider adenoids, and tomorrow the other subjects referred to.

In my clinic at the Boston Dispensary I have recently examined the records of 3000 children under fifteen, and I find the book diagnosis entered in nearly sixty-five per cent. to be adenoids or adenoids and enlarged tonsils. Ballenger says it has been estimated that adenoids are present in children otherwise normal in from one to nine per cent. of the cases examined. Sill says that twenty to twenty-five per cent. of children in his general clinic have adenoids or have had them removed. In deaf-mutes the percentage is much larger—fifty to seventy-five per cent. Seventy-five per cent. of ear troubles are due to adenoids. Kyle says that ninety per cent. of patients

having adenoids have some degree of deafness. Woakes says ninety-five per cent., Dench that more than half show trouble with the ear. In a series of 120 cases, twenty-six had lung troubles.

It is estimated that eighty-four per cent. of chronic nasal diseases are due to adenoids. According to Wells, adenoids constitute eighty-eight per cent. of all affections of the vault of the pharynx and twenty-five per cent. of all diseases of the upper throat, generally including the fauces. Faught states that the high contracted arch and respiratory obstruction are coincident in about forty-three per cent. of the cases. I feel sure that if a more careful examination were made this would be found in nearly all the cases.

The cause of respiratory obstruction which leads to mouth-breathing in children and to irregular dentition is preeminently adenoids.

In 1876, Joseph Meyer of Copenhagen first described this condition, and to him the world owes much for improved health and longevity.

Holt says, speaking of adenoids: "It is a very common condition and one very much neglected by the general practitioner. It is the source of more discomfort and the origin of more minor ailments than almost any other pathological condition in children."

Adenoids are hypertrophied lymph glands situated at the upper and posterior part of the naso-pharynx or, as we often say, the vault of the pharynx. Lymphoid tissue should normally exist in the post-nasal space, but by irritation, inflammation, and infection this velvety tissue becomes chronically enlarged and so materially obstructs the normal air-current. The smaller the naso-pharynx the more it obstructs if hypertrophied. At the sides of the vault are the internal openings of the Eustachian tubes, and just posterior the fossæ of Rosenmüller are situated. Adenoids often extend into this space and by closer relationship become a great source of danger to the Eustachian tubes and the ears. Heredity and climate seem to have little effect as a cause of adenoids. The family nose may be a factor. Sex makes no difference. Scheppegrell reports six and one-half per cent. of negroes in the total cases of adenoids in his clinic. The negro has broad, open nostrils, and therefore he has less actual obstruction from adenoids.

The presence of adenoids can often be traced to an attack of influenza, scarlet fever, measles, or some other of the children's diseases. Infection of the lymphoid and epithelial tissue is more apt to occur in childhood, for it is soft and friable and therefore susceptible. Adenoids may be found soon after birth. The period in which they are most frequently found is from three to twelve years. There is a tendency for atrophy to occur in adolesence at about fifteen, but this is by no means to be depended upon, as I have often operated on adults, and recently on a man of forty-two with large, soft adenoids.

SYMPTOMS.

We may have snuffles, frequent head colds requiring mouth-breathing, which is usually noisy; sleep is restless, often night terrors and enuresis are associated. With development we find the narrow pinched face and slit-like nostril, the alæ collapsing from non-use; the lips are parted, the upper lip becomes foreshortened and the upper central incisors are shown with a tendency to crowd together or overlap with the V-shaped in-

stead of the dome-shaped arch, and consequently with dental irregularity. The bridge of the nose thickens and there is a general listless, stupid expression to the face. Earache and dulness of hearing are frequent. Aprosexia or inability to learn or fix the attention is common. The child is apt to be pale, under-developed, narrow-chested, or with actual chicken breast. Epilepsy and chorea are often brought on by the presence of adenoids.

Clinical observation shows that if a child is going to have adenoids he will have them before eight years of age; between five and eight is the most prevalent period, and this is the time when they do the most harm in disturbing the second dentition.

There is no use in temporizing with medicine or waiting, because there is a tendency to atrophy at the age of fifteen. Irreparable harm may be done, and certainly nothing is gained. Operation is advisable in all cases where adenoids cause interference with nasal respiration, and especially if the ears are affected. An operation should be made early, before eight years. Occasionally the adenoids recur, but if a thorough operation is performed, and the sides of the fossæ of Rosenmüller are thoroughly curetted, recurrence is rare. Large tonsils should be removed at the same operation, usually before the adenoids.

There is a tendency to refer cases of irregular teeth to the orthodontist. The busy practitioner has no time for orthodontia. This is all right when the irregularities are pronounced and need much attention, but this is an age of preventive medicine, and whenever irregularity is due to mouth-breathing, it can and should be avoided. Parents are learning the necessity of caring for children's teeth early, and it is the dentist more than the family physician who is responsible for the form of the mouth and face, and for the proper eruption of the teeth during the plastic stage—seven to fourteen—when the bony framework of the face is easily molded. In the deciduous dentition irregular teeth are rarely found, and the first permanent molars are generally erupted regularly, but with the second dentition the trouble generally begins. The first molars should be preserved as long as possible. The dentist should see the patient early, and should detect the presence of that which will cause trouble in a few years, and advise operation. If any obstruction to nasal breathing is removed early, and the mouth-breathing habit is corrected, the superior maxillary bones will develop as they should, the arch will be dome-shaped, the teeth regular, and the occlusion usually perfect. Thumb-sucking and rubber nipples should never be allowed.

Remember the time for operating in order to avoid any deformity is during the plastic stage of the bones of the face. Mouth-breathing becomes almost a necessity even though the obstruction may be removed after the facial bones are molded rigidly into the high V-shaped arch. The danger from the operation in the hands of a skilled operator is very small when compared with the improvement in health. Ether is by far the safest anesthetic. The position for operating depends on the operator.

Finally, let me lay down this rule: Any condition in the nose or upper throat which interferes with the proper passage of air through the nose is a menace to good health. Ventilation and drainage of the upper air-passages must be maintained at all times. A patient is

never too young for correction of bad habits, but often too old. Bad habits mean mouth-breathing, which is the cause of the vast majority of dental irregularities. By early removing the adenoid or nasal obstruction—before six or eight—making possible the correction of the mouth-breathing habit, the need of orthodontia will be largely avoided, and the work will be better and more easily done. The health of the patient will be improved, his power of resistance will be increased, and his life will be prolonged.

Dr. Timothy Leary, Boston, Mass. "Laboratory Exhibit. — The Common Bacteria of the Oral Cavity, and Lesions Arising Therefrom."

The exhibit of this department on the "Bacteriology of the Mouth" consisted of cultures and microscopical demonstration of smears and lesions produced by the common mouth-bacteria.

PYOGENIC BACTERIA.

(1) *Pyogenic staphylococci.* Cultures of staphylococcus pyogenes aureus, albus, and citreus. Smears from cultures. Sections showing organisms in skin abscess (local infection) and heart abscess (general infection—pyemia).

(2) *Streptococcus pyogenes.* Cultures on milk-agar and on blood-agar (to show hemolysis). Smears from cultures. Section of lung showing organisms in streptococcus broncho-pneumonia.

(3) *Pneumococcus.* Cultures on blood serum and blood-agar. Smears from cultures. Section of lung showing bacteria in lobar pneumonia.

(4) *Bacillus mucosus capsulatus.* Cultures on agar. Smear from culture. Section of lung showing capsulated bacilli in lobar pneumonia (Friedländer's type).

(5) *Diphtheria bacillus.* Cultures on blood serum. Smear from culture. Section of trachea showing organisms in pseudo-membrane.

(6) *Bacillus aerogenes capsulatus.* Culture on blood-agar to show extreme type of hemolysis. Smear from culture. Section of lung to show organisms in circulating blood.

(7) *Tubercle bacillus.* Cultures in glycerin bouillon and agar. Smears from culture. Section of lung to show almost pure culture of bacteria in walls of lung cavity.

(8) *Typhoid bacillus.* Cultures on bouillon and agar. Smears to show flagella. Preparation to show Widal test.

(9) *Fusiform bacillus.* Cultures in blood-agar — noma — anaerobic plate. Smears from dirty mouth to show spirilla. Smears from pyorrhea pockets to show predominance of spirilla. Smears from noma to show bacillary and spirillum forms. Smears from Vincent's angina to show both forms. Sections from tissue in two cases of noma to show felt-like masses of bacteria invading and destroying tissues.

(10) *Spirochæta pallida.* Smears from chancre of the lip and buccal mucous patches to show spirochætæ.

(11) *Cultures of pigment-producing bacteria.*

(12) Plate cultures from clean and dirty mouths. A series of six cultures from clean and dirty mouths for contrast. Plates made under identical conditions from unprepared mouths, the dirty mouth showing about twenty times the number of colonies obtained from the clean mouth. Plates on blood-agar showing the possibility of cultivating by this

method many varieties of bacteria which will not grow on other media. Anaerobic plates to show method of anaerobic plate culture with Leary jar.

Dr. G. V. N. Dearborn, Boston, Mass. "Physiology Exhibit."

The physiological demonstrations were given in two of the rooms of the physiological laboratory on the ground floor of Tufts College Dental School, and attracted a large number of visitors. The exhibition was intended to show both a few familiar vital processes and the methods of modern teaching in the laboratory. There were two demonstrations of the actual blood circulation as it is to be seen in the frog's foot. The shape, color, and relative number of the blood corpuscles and the speed of the current through the arterioles and capillaries were readily to be seen under the compound microscope. Another arrangement of apparatus exhibited the action of the mitral and tricuspid valves of the heart of the ox. An electric lamp inserted in the left ventricle allowed the valve action to be clearly seen.

The small and transparent crustacean Daphnia exhibited in a valuable way all of the basal processes at once. One could see the circulating blood and the beat of the simple heart by which it is kept in motion. Digestion was epitomized in the pulsating digestive gland and in the peristalsis of the conspicuous intestine. Respiration was seen in the rapidly moving gills attached to the feet. Embryos in various stages of development were obvious in the brood-sac. Eye movements could be studied and various matters concerned with the action of muscles in the eyes and in the vigorous antennæ.

The other demonstrations showed the methods illustrating other processes in the hearts of the frog and tortoise, especially the tonus of the heart, which is probably of great importance in adapting the action of this organ to the essential vaso-motor changes elsewhere in the body. The method of studying the respiration movements was shown in the Florida chameleon and in man. Another mechanism demonstrated by means of Cannon's method with the zoetrope the peristaltic and segmenting movements of the cat's stomach and the small and large intestines.

Altogether, Professor Dearborn and some of his assistants gave a striking and instructive suggestion of some of the routine work done in an up-to-date physiological laboratory. The importance of such knowledge to the student of dentistry is frequently ill appreciated even by the practitioner, especially if his education was obtained before the modern method of instruction was adopted by the dental schools.

APPENDIX.

Organization of the N. D. A.

OFFICERS, 1908-09.

President—V. E. Turner, 107½ Fayetteville st., Raleigh, N. C.
Vice-president—East, Eugene H. Smith, 283 Dartmouth st., Boston, Mass.
" " —*South,* Wm. Crenshaw, 621 Prudential Bldg., Atlanta, Ga.
" " —*West,* W. T. Chambers, California Bldg., Denver, Colo.
Corresponding Secretary—H. C. Brown, 185 East State st., Columbus, Ohio.
Recording Secretary—C. S. Butler, 267 Elmwood ave., Buffalo, N. Y.
Treasurer—A. R. Melendy, Deaderick Bldg., Knoxville, Tenn.

EXECUTIVE COUNCIL.

Chairman—H. J. Burkhart, Batavia, N. Y.

A. H. Peck, 92 State st., Chicago, Ill.
F. O. Hetrick, Ottawa, Kans.
B. Holly Smith, 1007 Madison ave., Baltimore, Md.
W. E. Boardman, 419 Boylston st., Boston, Mass.
V. E. Turner, C. S. Butler (*ex-officio* members).

EXECUTIVE COMMITTEE.

Chairman—J. D. Patterson, Keith & Perry Bldg., Kansas City, Mo.

FIRST DIVISION—Committee on Arrangements.

J. D. Patterson [*1909], Keith & Perry Bldg., Kansas City, Mo.
C. M. Work [*1909], Ottumwa, Iowa.
C. J. Grieves [*1911], Park ave. and Madison st., Baltimore, Md.

SECOND DIVISION—Committee on Credentials and Auditing.

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PAST PRESIDING OFFICERS.

I. PRIOR TO CONSOLIDATION.

Ex-Presidents American Dental Association.

1859. *W. W. Allport, Chicago, Ill.
First meeting, for organization.
1860. *W. H. Atkinson, Cleveland, Ohio.
1861. (No meeting.)
1862. *George Watt, Xenia, Ohio.
1863. *W. H. Allen, New York, N. Y.
1864. *J. H. McQuillen, Philadelphia, Pa.
1865. *C. W. Spalding, St. Louis, Mo.
1866. *C. P. Fitch, New York, N. Y.
1867. *A. Lawrence, Lowell, Mass.
1868. *Jonathan Taft, Cincinnati, Ohio.
1869. *Homer Judd, St. Louis, Mo.
Owing to a change in the constitution, officers elected at this and the sessions following served at the annual meeting subsequent to their election.
1870. *W. H. Morgan, Nashville, Tenn.
1871. *Geo. H. Cushing, Chicago, Ill.
1872. *P. G. C. Hunt, Indianapolis, Ind.
1873. *T. L. Buckingham, Philadelphia, Pa.
1874. *M. S. Dean, Chicago, Ill.
1875. *A. L. Northrop, New York, N. Y.
1876. *Geo. W. Keeley, Oxford, Ohio.
1877. *F. H. Rehwinkel, Chillicothe, Ohio.
1878. *H. J. McKellops, St. Louis, Mo.
1879. L. D. Shepard, Boston, Mass.
1880. C. N. Peirce, Philadelphia, Pa.
1881. H. A. Smith, Cincinnati, Ohio.
1882. *W. H. Goddard, Louisville, Ky.
1883. E. T. Darby, Philadelphia, Pa.
1884. J. N. Crouse, Chicago, Ill.
1885. *W. C. Barrett, Buffalo, N. Y.
1886. *W. W. Allport, Chicago, Ill.
1887. *Frank Abbott, New York, N. Y.
1888. C. R. Butler, Cleveland, Ohio.
1889. M. W. Foster, Baltimore, Md.
1890. A. W. Harlan, Chicago, Ill.
1891. W. W. Walker, New York, N. Y.
1892. J. D. Patterson, Kansas City, Mo.
1893. (Formal session only, owing to the holding of the World's Columbian Dental Congress; officers elected in 1892 holding over until 1894.)
1894. J. Y. Crawford, Nashville, Tenn.
1895. J. Y. Crawford, Nashville, Tenn.
1896. James Truman, Philadelphia, Pa.

Ex-Presidents Southern Dental Association.

1869. *W. T. Arrington, Memphis, Tenn.
First meeting, for organization; Jas. S. Knapp being chairman *pro tem.*
1870. *W. T. Arrington, Memphis, Tenn.
1871. *Jas. S. Knapp, New Orleans, La.
1872. *F. Y. Clark, Savannah, Ga.
1873. *H. M. Grant, Abingdon, Va.
1874. *Robert Arthur, Baltimore, Md.
1875. *J. R. Walker, New Orleans, La.
1876. *W. T. Arrington, Memphis, Tenn.
1877. *W. G. Redmund, Louisville, Ky.
1878. S. J. Cobb, Nashville, Tenn.
1879. F. J. S. Gorgas, Baltimore, Md.
1880. *J. B. Patrick, Charleston, S. C.
1881. V. E. Turner, Raleigh, N. C.
1882. E. S. Chisholm, Atlanta, Ga.
1883. L. D. Carpenter, Atlanta, Ga.
1884. *H. J. McKellops, St. Louis, Mo.
1885. *A. O. Rawls, Lexington, Ky.
1886. *W. C. Wardlaw, Augusta, Ga.
1887. *W. W. H. Thackston, Farmville, Va.
1888. *B. H. Catching, Atlanta, Ga.
1889. J. Y. Crawford, Nashville, Tenn.
1890. *John C. Storey, Dallas, Tex.
1891. G. F. S. Wright, Georgetown, S. C.
1892. Gordon White, Nashville, Tenn.
1893. B. Holly Smith, Baltimore, Md.
1894. (Same officers held over.)
1895. *H. E. Beach, Clarksville, Tenn.
1896. John S. Thompson, Atlanta, Ga.
1897. W. H. Richards, Knoxville, Tenn.

* Deceased.

II. SINCE CONSOLIDATION.

Ex-Presidents National Dental Association.

1897. *Thomas Fillebrown, Boston, Mass.
1898. Harvey J. Burkhart, Batavia, N. Y.
1899. B. Holly Smith, Baltimore, Md.
1900. G. V. Black, Chicago, Ill.
1901. J. A. Libbey, Pittsburg, Pa.
1902. L. G. Noel, Nashville, Tenn.
1903. *C. C. Chittenden, Milwaukee, Wis.
1904. Waldo E. Boardman, Boston, Mass.
1905. M. F. Finley, Washington, D. C.
1906. A. H. Peck, Chicago, Ill.
1907. William Carr, New York, N. Y.

* Deceased.

Constitution of the National Dental Association.

PREAMBLE.

We, the members of the American Dental Association and of the Southern Dental Association, do declare ourselves a Society to cultivate the Science of Dentistry, and have adopted the following Constitution and Rules of Order for our government:

CONSTITUTION.

(Adopted at Old Point Comfort, August 5, 1897. Revised and amended at Asheville, N. C., August 1903.)

ARTICLE I.

NAME.

This organization shall be known by the name of the National Dental Association.

ARTICLE II.

OBJECT.

The object of this Association shall be to cultivate the science and art of dentistry and all its collateral branches, to elevate and sustain the professional character of dentists, to promote among them a mutual improvement, social intercourse and good feeling, and collectively to represent and have cognizance of the common interests of the dental profession.

ARTICLE III.

MEMBERS TO BE OF THREE CLASSES.

Section 1. The members of this Association shall be of three classes, viz, permanent, delegate, and honorary members; the two former classes having equal rights and privileges, except that none but permanent members shall be eligible to office.

PERMANENT MEMBERS.

Sec. 2. Permanent members shall consist of those who, coming as delegates and complying with the requirements of the Association, shall sign a statement in a book to be kept for that purpose, signifying to the Treasurer a desire for permanent membership.

DELEGATE MEMBERS.

Sec. 3. All members shall be practitioners of dentistry. They shall be received only from permanently organized state dental societies. They shall be elected by ballot at some regular meeting of their society, and shall be members who have done some meritorious work for the profession; but no person shall be received as a delegate who is in arrears for dues to this Association.

Sec. 4. Honorary members shall consist of prominent, worthy members of the dental profession residing in foreign countries, who shall be elected by ballot.

Sec. 5. It is hereby specially provided that all persons at present permanent members of the American Dental Association and of the Southern Dental Association are permanent members of this Association, and entitled to all the privileges of the class to which they belong, without further action, and the Treasurer is hereby directed to transcribe their names upon the roll of membership of this Association.

ARTICLE IV.

DELEGATES FROM STATE SOCIETIES.

Section 1. That delegates may be received from any state society, district society, or local society affiliated with the state society, upon the certificate of the president and secretary of the state society, and that these

delegates may become members by sending their certificate together with the fee to the Treasurer of the National Dental Association.

SEC. 2. Each delegate shall present credentials which shall be approved by the Executive Committee.

SEC. 3. If the Committee on Credentials has knowledge that any applicants for membership are violating the Code of Ethics, said applicants shall not be received, but shall be referred by the committee to the societies whose delegates they are, and in no case shall this Association be compelled to treat with violations of the Code except the violator is a member of this body and has no membership in any local body.

SEC. 4. This Association will receive no delegates who, since August 1875, shall have entered the profession without having first graduated at some reputable dental or medical college.

ARTICLE V.

SIGNING CONSTITUTION.

SECTION 1. Each new member, before voting or speaking on any subject before the meeting, shall sign this Constitution, inscribing his name and the title of the society from which he receives his appointment. It is expressly agreed by each member in signing this Constitution that he will accept the discipline of a two-thirds vote of this Association.

DUES.

SEC. 2. The annual dues in this Association shall be five dollars.

DUES TO BE PAID.

SEC. 3. No member is eligible to office, nor can he speak or vote in this Association, in any of its sections, or in any of its branches, until his annual dues are paid.

DUES—IF UNPAID.

SEC. 4. If the dues of any member remain unpaid for two years his name shall be erased from the list of members of this Association.

CONDUCT OF MEMBERS.

SEC. 5. Any act of special immorality or unprofessional conduct committed by a member of this Association shall be referred to the Executive Committee, whose duty it shall be to thoroughly examine into the case, and if the charges be sustained, to report to the Executive Council during the annual session at which the charges are preferred. Whereupon, by a vote of the Council the offending member may be reprimanded or expelled, a two-thirds vote being required for expulsion, a majority being sufficient for reprimand.

EXPELLED MEMBERS.

SEC. 6. Any member of this Association being expelled or suspended from his local society, shall from that date cease to be a member of this body.

RESIGNATION OF MEMBERS.

SEC. 7. Any member not in arrears may offer his resignation, upon the acceptance of which by the Council his membership shall cease; but the Council may at any time thereafter reinstate such member by unanimous consent. In case a member is dropped for non-payment of dues, two years' dues must be paid before reinstatement; nor shall he represent his society as a delegate until the two years' back dues are paid.

ARTICLE VI.

OFFICERS.

SECTION 1. The officers of this Association shall be a President, three Vice-presidents, Corresponding Secretary, Recording Secretary, Treasurer, an Executive Committee consisting of nine members, an Executive Council consisting of the President, Secretary, and five members, three Chairmen and three Secretaries of Sections, to be elected as hereinafter provided.

SEC. 2. Each officer, except as otherwise provided, shall hold his appointment for one year, or until another is elected and qualified to succeed him.

SEC. 3. The President shall be chosen from the division in which the next annual session is to be held, and one of the Vice-presidents shall be chosen from each division. (See Article XII.)

SEC. 4. At the first election three members of the Executive Committee shall be elected from each division of the country, who shall hold office for one, two, and three years, respectively; afterward but one member shall

be elected each year from each division, and hold office for three years.

SEC. 5. One member of the Council shall be elected each year from the division in which the newly elected President resides, and two members from each of the others.

SEC. 6. At the first election after this amendment goes into effect, one Chairman and one senior and one junior Past Chairman for each section shall be elected. Thereafter one Chairman and one Secretary of Sections shall be elected each year from each division, and each Chairman of Sections shall be known as Junior Past Chairman for the first year and as Senior Past Chairman for the second year after the expiration of his time as Chairman.

SEC. 7. The names of places for holding the next annual session and the candidates for office shall be nominated by informal ballot of the Association. The three names that are highest, or in case of tie, four names having the greatest number of votes shall be the sole nominees. A formal ballot shall then be taken in which a majority of the ballots cast shall be necessary to a choice. If a choice be not made on the second formal ballot the name of the candidate receiving the fewest votes shall be dropped on the third formal ballot. The informal ballot may be made a formal ballot by a three-fourths vote of the Association. Provided that for the re-election of Recording Secretary, Corresponding Secretary, Treasurer, and Secretaries of Sections a motion, seconded, that the recording Secretary, or Treasurer, shall cast the ballot, shall be entertained, but if this fails to carry, nominations shall be made as hereinbefore specified.

ARTICLE VII—DUTIES OF OFFICERS.

DUTIES OF PRESIDENT.

SECTION 1. The President shall preside according to parliamentary usage as laid down in "Robert's Rules of Order" and the Rules of Order adopted by this Association, and shall present an annual address.

DUTIES OF VICE-PRESIDENT.

SEC. 2. In the absence of the President, one of the Vice-presidents shall perform the duties of the office, and in absence of these officers a Chairman *pro tem.* shall be appointed by the Executive Council.

DUTIES OF CORRESPONDING SECRETARY.

SEC. 3. The Corresponding Secretary shall attend to the correspondence of the Association with other scientific bodies, when desirable, and with the societies represented in this Association. It shall be his duty to obtain information of and report annually to the Executive Council, and with its approval to this Association, an account of the meetings held, the numbers of the membership and attendance, subjects discussed in papers, essays, or otherwise, by the societies represented in this Association, and such other matters of interest as may be well to incorporate in the proceedings of this body.

DUTIES OF RECORDING SECRETARY.

SEC. 4. The Recording Secretary shall keep accurate minutes of the proceedings of the Association, preserve the archives and unpublished documents, and attend to the other duties that pertain to his office. He shall be *ex officio* Chairman of the Publication Committee, and shall see that due notice is given of the time and place of the annual sessions of the Association. He shall be secretary of the Program Committee, and see to the preparation and printing for this committee and its distribution to the members of all societies represented in this Association, and shall provide each newly elected official with a correct copy of this Constitution.

DUTIES OF TREASURER.

SEC. 5. The Treasurer shall hold all the moneys belonging to the Association, and shall keep an accurate account as between the Association and its members. He shall furnish bonds satisfactory to the Executive Committee. He shall attend the session of the Executive Committee at 9 A.M. on the first day of the annual session to receive dues, and shall attend at roll call to verify the lists of names upon payment of dues within the legal limits, and shall notify all whose names may be erased from the list of membership. He shall pay the drafts of the Secretary, countersigned by the President, and shall report to the Executive Committee, where his accounts shall be audited and by

whom his report shall be presented to the Executive Council, together with their own.

SEC. 6. All resolutions appropriating money, except for the legitimate expense of this Association, shall require a two-thirds vote of all the members of the Association present at a general session of an annual session.

ARTICLE VIII.

EXECUTIVE COMMITTEE.

SECTION 1. The Executive Committee shall be the business committee *ad interim* of the Association. They shall report to the Executive Council at each annual session, under the proper head, their doings for the current year.

SUB-DIVISION OF THE EXECUTIVE COMMITTEE.

SEC. 2. The Executive Committee shall meet after the election of new members to choose their own chairman and secretary, and to divide themselves into three sub-committees as follows, and for the purpose described:

FIRST DIVISION OF THE EXECUTIVE COMMITTEE.

SEC. 3. The first division of the Executive Committee shall include its chairman. It shall act as the Committee of Arrangements, and shall make suitable preparations for the meetings of the Association, consulting with the Program Committee as to its needs. It shall report to the Executive Council at its first meeting of the annual session and with its approval see to the carrying out of the arrangements during the annual session. It shall provide a book for the registration of members or visitors as they arrive; and it shall be their further duty to secure from the Treasurer a good and sufficient bond.

SECOND DIVISION—CREDENTIALS AND AUDITING COMMITTEE.

SEC. 4. The second division of the Executive Committee shall act as a committee on registration, and shall meet for that purpose at 8 A.M. on the first day of the annual session. They shall examine and verify the qualifications of members, including all violations of the Code of Ethics and the Constitution. They shall register the names of members or visitors as they arrive, with place of their residence and hotel address, and give them all necessary information regarding the arrangements for the meetings, the literary program and arrangements for entertainment, if any. They shall also act as the auditing committee for the year.

THIRD DIVISION—COMMITTEE ON VOLUNTEER ESSAYS.

SEC. 5. It shall be the duty of the third division to examine all essays, papers, or reports that may be referred to it by the Executive Council before presentation to the Association and to report to the Executive Council their approval or disapproval of such essays, papers, or reports in whole or in any particular parts, to the end that the time of the Association may not be occupied by the reading of irrelevant, unimportant, or improper matter.

REPORTS OF SUB-COMMITTEES.

SEC. 6. Each of these Sub-Committees shall report from time to time, as may be necessary, to the Executive Committee as a whole, who shall decide upon such report, if possible; but in case of their inability to decide upon any matter, it shall be brought before the Executive Council for its decision.

MEETINGS OF EXECUTIVE COMMITTEE.

SEC. 7. The Executive Committee shall, if possible, meet for consultation and arrangement of their respective duties on the day preceding the annual session of the Association. The Chairman may at his discretion summon the members thereof to a meeting for consultation or making reports, at any suitable hour during the annual session of the Association, and at any other time at the request of five members of the committee.

ARTICLE IX.

EXECUTIVE COUNCIL.

SECTION 1. The Executive Council shall be the business head of the Association during its annual session, and when it deems it necessary have charge of all its business matters whatever; and it will be its duty to take cognizance of the doings of any and all of its officers, see to the smooth working of all of its parts, and attend to all matters referred to it.

SEC. 2. The Executive Council shall meet at nine o'clock on the day of the first meeting of each annual session, to receive the reports of committees, and afterward by adjournment or at the call of the presiding officers and committees, for the transaction of other business of the Association.

SEC. 3. All matters not otherwise specially provided for shall be referred to the Executive Council without debate.

SEC. 4. The Executive Council shall report to the Association at each general session the results of their proceedings for ratification or rejection without debate.

SEC. 5. The President and Secretary of this Association shall hold the same positions in the Executive Council as in the Association.

SEC. 6. Five members of the Council shall constitute a quorum for the transaction of business.

SEC. 7. All meetings of the Council shall be public; the time and place for which shall be posted for information of the members. Members may be heard on any matter before the Council.

ARTICLE X.

LOCAL COMMITTEE OF ARRANGEMENTS.

SECTION 1. There shall be appointed by the President, annually, a committee of three, residing at or near the place selected for the next meeting, whose duty it shall be to assist the Executive Committee to procure rooms for meetings, and make such other local arrangements as may be needed for the Association.

VACANCIES.

SEC. 2. In case vacancies occur in the Committees or Officers of this Association by reason of absence from the annual session or otherwise, such vacancies shall be filled by appointment *pro tem.* by the President.

PUBLICATION COMMITTEE—HOW APPOINTED.

SEC. 3. The President shall appoint two members of this Association who shall act in conjunction with the Recording Secretary as the Publication Committee. The Committee shall be authorized to employ a sufficient number of competent reporters to furnish an accurate report of the proceedings of each meeting of sections and of each general session.

ARTICLE XI.

INSTRUCTIONS TO THE PUBLICATION COMMITTEE.

SECTION 1. The Publication Committee shall superintend the publication and distribution of such portions of the transactions as the Executive Council may direct, or the Committee judge to be of sufficient value.

They shall specify in the annual report of this Committee the character and cost of the publications of the Association during the year, to whom they are distributed, and the number of copies still on hand.

SEC. 2. Any report or other paper to be entitled to publication in the volume of Transactions for the year in which it shall be presented to the Association, must be placed in the hands of the Publication Committee in typewritten form within twenty days after the close of the annual session; and must also be so prepared that the proof sheets furnished the authors shall be returned to the Committee without material alteration or addition.

SEC. 3. Every paper received and accepted by this Association, and all plates or other means of illustration, shall be considered the property of the Association, so far as may be necessary for the publication in the Transactions of this body.

DISCLAIMER.

SEC. 4. The Publication Committee is hereby instructed to print at the beginning of each volume of the Transactions the following disclaimer, viz: "The National Dental Association, although formally accepting and publishing the reports of the various sections, and the essays read before the Association, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution."

ARTICLE XII.

SECTION 1. For the purpose of this Association, the United States shall be divided into three divisions, to be called the East, the South, and the West.

The East shall include New England, New York, New Jersey, Pennsylvania, Ohio, In-

diana, lower peninsula of Michigan, and Ontario.

The South shall include Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, West Virginia, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Kentucky, Tennessee, Arkansas, Oklahoma, and Indian Territory.

The West shall include Illinois, Missouri, Wisconsin, upper peninsula of Michigan, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Idaho, Utah, Washington, Oregon, Nevada, California, Arizona, New Mexico, and Alaska.

PLACE OF MEETING.

SEC. 2. The place of holding the next annual session shall be determined each year by ballot of the Association at its annual session, in the general session of the third day, except that the place of meeting shall be in the West in 1898, in the East in 1899, and in the South in 1900, and thereafter, in the order named, meeting in each section every third year.

ARTICLE XIII.

ORGANIZATION OF SECTIONS.

SECTION 1. This Association shall be divided into three sections, as follows:

The first section shall have charge of prosthetic dentistry, crown and bridge work, orthodontia, metallurgy, chemistry, and allied subjects.

The second section shall have charge of operative dentistry, nomenclature, literature, dental education, and allied subjects.

The third section shall have charge of oral surgery, anatomy, physiology, histology, pathology, etiology, hygiene, prophylaxis, materia medica, and allied subjects.

SEC. 2. It shall be the duty of each member to identify himself with one or more of the above-named sections, and he shall inform the Recording Secretary of his choice at the time of joining the Association.

SEC. 3. The Secretary shall assign members to the sections in which they are expected to work if they shall fail to make their own choice before the close of the general session of the second day of the annual session.

SEC. 4. It shall be the duty of the Recording Secretary to keep a list of the members of the sections and to furnish copies of the same to the officers of the sections.

SEC. 5. The Chairman of each section shall preside at all of its meetings; shall exercise general supervision over its business, and shall see that the labors of his section are so conducted as to secure the best results. In the absence of the Chairman the senior or junior past Chairman shall preside. (See Article VI, Section 6.)

SEC. 6. The Secretary of each section shall keep full and accurate records of the doings of his section, shall have charge of the stenographic reports, and report the same to the Recording Secretary each day, as soon as possible after their approval by his section.

SEC. 7. For information of all members a list of the names of members of sections shall be published in the Transactions of each year.

ARTICLE XIV.

MEETINGS.

SECTION 1. The meetings of this Association shall be known as annual sessions, general sessions, and meetings of sections.

SEC. 2. The annual sessions shall begin on the first Tuesday in August of each year and continue four days.

SEC. 3. The general sessions shall be meetings of the whole membership in attendance upon the annual session, and shall be held as follows:

The first general session shall convene at 10 o'clock on the first day and shall stand adjourned at 1 P.M., unless adjourned earlier. During this session the functions appropriate to the opening of the annual session may be performed, and the annual address of the President delivered.

On the second, third, and fourth days the Association shall convene in general session at 12 o'clock, noon, and stand adjourned at thirty minutes past one, unless adjourned sooner.

SEC. 4. In the general sessions any member may introduce matters of business, if seconded, which must then be referred to the Executive Council without debate; provided, that any member, opposed to such matter of business or motion, with a second, may call for a vote on such reference. A vote shall then be taken without debate, and if

decided in the negative, that shall dispose of the matter for that annual session.

SEC. 5. The general session shall receive reports from the Executive Council as the first order of business after the reading of the minutes, and shall approve or annul any matter of business or motions referred to it by the Executive Council by vote without debate.

SEC. 6. The election of officers of the Association shall be held at the general session of the third day of the annual session, and newly elected officers presiding over the general sessions shall be installed at the close of the general sessions on the fourth day, and those presiding over meetings of each section, at the close of the last meeting of the section during the annual session.

SEC. 7. At the second and fourth general session there may be presented such addresses or reports as may be determined by the Program Committee, with the approval of the Executive Council, but these shall in no case occupy more than one hour of the general session.

SEC. 8. Sections I, II, and III shall each meet in separate rooms at 2.30 o'clock on the first day of the annual session for the reading and discussion of such essays, papers, reports, or for clinics, as may be determined upon by the Program Committee, with the approval of the Executive Council. Thereafter similar meetings of each section shall be held at 9 A.M. and 2.30 P.M. each day of the annual session. Evening meetings of the sections may be held as determined by each section.

SEC. 9. No business of any kind not strictly pertaining to the proper carrying out of the literary, scientific, or clinical work of the sections shall be introduced or considered in the meetings of the sections.

ARTICLE XV.

PROGRAM COMMITTEE.

SECTION 1. The Committee on Program shall consist of the President, Secretary, the Chairmen of sections, and the two last past Chairmen of sections. It shall be the duty of this Program Committee to keep close watch over the progress of dental science and literature, and to arrange with competent persons in the profession who are members of this Association, or with persons of known ability in closely allied subjects in science not members, to prepare and read or to discuss essays, papers, contributions, or perform such clinical demonstrations as will tend to the improvement of dentistry. It shall report to the Chairman of the Executive Committee what special preparations may be needed for carrying out the program that may be arranged or contemplated.

SEC. 2. The senior past Chairman, junior past Chairman, and Chairman of each section shall, subject to the Committee, act as a Subcommittee having especial charge of the program of that section, the responsibility in this work being in the order named.

SEC. 3. The President of the Association shall be President of the Program Committee, or, when present, shall preside over meetings of a Sub-committee. The preparation of the program for the general sessions shall be under his charge. In meetings of the Program Committee, in the absence of the President, the senior past Chairman of sections present shall preside, seniority beginning with the division in which the President resides and following the order of rotation.

SEC. 4. The Recording Secretary shall act as the Secretary of the Program Committee and shall have charge of the preparation, printing, and distribution of the programs. He shall announce at each general session the arrangement of the program for the next general session; and also the program for each of the sections for the next twenty-four hours.

SEC. 5. The Program Committee shall meet for consultation regarding the next year's work as soon as possible after the election of officers, and hold such meetings thereafter on the call of the President or Secretary, as may be deemed necessary to the efficient carrying out of the work.

SEC. 6. The Program Committee shall report to the Executive Council at its first meeting on the morning of the first day of the annual session the program arranged for approval, and thereafter shall hold such meetings as may be necessary to arrange from day to day for the smooth working of the presentation and discussion of the matter of the program in the general sessions and meetings of sections.

ARTICLE XVI.

QUORUM.

Twenty members shall constitute a quorum in this Association.

ARTICLE XVII.

SUSPENSION OF RULES—THREE-FOURTHS TO VOTE.

The regular order of business may be temporarily suspended by a three-fourths vote of all the members present, for the consideration of a specific subject, upon the completion of which the regular order shall be at once resumed.

ARTICLE XVIII.

BRANCHES.

SECTION 1. For the wider diffusion of the benefits of this Association, the members of each division may form themselves into one or more separate bodies, to be styled "Branches."

POWERS AND OBLIGATIONS.

SEC. 2. Branches shall have such powers and privileges, and be subject to such obligations, as shall be determined upon from time to time by the National Association in annual session.

SEC. 3. Each Branch shall be free to hold meetings and to govern itself as its members shall think fit, but no Branch law shall be valid which in the opinion of the National Association may contravene any fundamental law of the Association.

SEC. 4. Each Branch shall pay its own expenses, and no Branch shall be deemed for any purpose the agent of the Association, or have power to incur any obligation in its behalf.

SEC. 5. Each Branch shall furnish a copy of its proceedings, including papers and discussions, for publication with the Transactions of the National Association.

SEC. 6. Each Branch may receive delegates from societies within its division upon the same conditions as the National Association, and such delegates shall have the same standing in the National Association as though admitted directly from state societies.

DUES.

SEC. 7. The annual dues of members attending the Branches shall be paid to the Branch Treasurer. Three-fifths of the dues may be retained for the benefit of the Branch. The remaining two-fifths shall be paid over to the Treasurer of the National Association.

SEC. 8. The annual session of any Branch shall be omitted whenever the annual session of the National Association shall be held in its division.

ORDER OF BUSINESS.

FIRST DAY.

8 A.M.—Meeting of the Executive Committee.
8 A.M.—Meeting of the Program Committee.
9 A.M.—Meeting of the Executive Council.
10 A.M.—Meeting in general session.
Report of Executive Council.
Report on Program for next general session and for each section for next 24 hours.
President's Address.
1 P.M.—Adjournment of general session, unless sooner adjourned.
2.30 P.M.—Meetings of sections for literary and scientific work.
8 P.M.—Meetings of sections for literary and scientific work.

SECOND DAY.

9 A.M.—Meetings of sections for literary and scientific work.
12 NOON—Meeting in general session.
Reading of Minutes.
Report of Executive Council.
Report on Program.
Address, or Reports.
2.30 P.M.—Meetings of sections for literary and scientific work.
8 P.M.—Meetings of sections for literary and scientific work.

THIRD DAY.

9 A.M.—Meetings of sections for literary and scientific work.
12 NOON—Meeting in general session.
Reading of Minutes.
Report of Executive Council.
Report on Program.
Selection of next place of meeting.
Election of Officers.
1.30 P.M.—Adjournment, if not adjourned earlier.
2.30 P.M.—Meetings of sections for literary and scientific work.
8 P.M.—Meetings of sections for literary and scientific work.

FOURTH DAY.

9 A.M.—Meetings of sections for literary and scientific work.
12 NOON—Meeting in general session.
Reading of Minutes.
Report of Executive Council.
Address, or Reports.
Installation of Officers.
Appointment of Committees.
Final Reading of Minutes.
Adjournment of the Annual Session.

AMENDMENTS.

The Constitution, Rules of Order and Order of Business of this Association may be altered or amended at any annual session by unanimous consent of the members present, providing notice has been given in writing at a previous meeting of the annual session at which the amendment is proposed; or by a vote of two-thirds of the members present, providing notice of the alteration or amendment has been given in writing at a previous annual session.

STANDING RESOLUTIONS.

The following standing resolutions are in force at this time:

1. Resolved, That a paper presented to the Committee on Voluntary Essays, and by them considered and returned to the writer with notification that the said paper is not accepted, cannot afterward be read before the Association unless it is made the special order by resolution adopted.

2. Resolved, That this Association discountenances the giving of banquets, excursions, entertainments, etc., by local professional societies or individuals, either during or at the close of our annual meetings.

3. Resolved, That it is unprofessional to use on cards or signs anything except name, title, and address.

4. Resolved, That this Association now in session direct that sections belonging thereto shall in the future be prohibited from inviting individuals who are violating the Code of Ethics to hold clinics or to give other exhibitions before this body.

5. Resolved, That a standing committee of three be appointed, to be known as the Committee on Terminology, whose duty it shall be to prepare and submit a carefully prepared report at each annual meeting of this Association.

6. Resolved, That this Association believes the conferring of honorary degrees in dentistry to be detrimental to the profession of dentistry, and hereby expresses its disapprobation of the practice.

7. Resolved, That a committee of three be appointed by the chair to co-operate with the officers in charge of the Army Medical Museum and Library in enriching its store of dental literature and specimens, especially by appealing to dental societies and individual members of the dental profession for assistance.

8. Resolved, That the National Dental Association condemns the use of secret preparations known as "*local anesthetics*," as well as all other secret preparations.

9. Resolved, That the secretary or other officer of each society sending delegates to this Association is expected to make a general report of the work done by the society he represents during the year, giving the subjects of the papers read before them and digests of the same, and to send said reports to the Secretary of this Association at least three weeks before the date of each annual meeting; the reports to be forwarded to the chairman of the section to which they belong.

10. Resolved, That any member of the dental profession who has been in reputable practice for a period of fifty years may be elected to permanent membership in the Association without payment of dues, and any member of this Association who has been in practice for a like period shall have his dues remitted thereafter by presenting the fact to the Treasurer of the Association.

11. Resolved, That lists of the ex-presidents of the American Dental Association and of the Southern Dental Association shall be published annually in the Transactions of the National Dental Association, and that all members and officers hold the same relations to the National Dental Association that they did to the former associations.

RULES OF ORDER.

1. On the arrival of the hour of meeting, the President shall take the chair, call to order, and announce that the meeting is open for business.

2. No motion or speech shall be in order until the mover or speaker shall have been recognized and assigned the floor by the chair, nor shall a motion be open for debate until seconded and stated by the chair.

3. No one shall be permitted to address the Association before giving his name and residence, which shall be distinctly announced from the chair; nor shall he speak more than twice, nor longer than fifteen minutes in all, unless by consent of the Association.

4. At the request of any member a motion shall be put in writing.

5. At the request of five members a question shall be divided or the yeas and nays ordered.

6. When a question is under debate no other motion shall be in order, except—1st, to adjourn; 2d, to lay on the table; 3d, the previous question; 4th, to postpone; 5th, to commit; 6th, to amend—and these motions shall take precedence in the order here stated.

7. The previous question and the motions to adjourn, to lay on the table, and to postpone, shall be decided without debate.

8. A motion to adjourn shall always be in order, but no member can make such a motion while another is speaking or while a vote or ballot is being taken.

9. A second amendment to the main question shall not be in order until the first is disposed of, nor shall there be an amendment of an amendment to an amendment.

10. After a motion has been seconded and stated by the chair, it shall not be withdrawn without the consent of the Association.

11. No member shall interrupt another while speaking, except to raise a point of order.

12. When called to order, a member shall sit down until the point of order is decided by the chair, or, in case of appeal, by the Association. If the point of order be sustained, the member can proceed in order by the consent of the Association.

13. Every member shall vote upon a question unless excused by the Association.

14. When any motion, except to adjourn, has been rejected, it shall not be renewed without unanimous consent.

15. Any member who on a question voted in the majority may move a reconsideration of that question; but if that motion shall be lost or laid upon the table, it shall not be renewed without unanimous consent.

16. The President may vote with the members upon all questions, but having so voted, shall not give the casting vote in case of a tie.

17. Motions for filling blanks shall be put in the order in which they are moved.

18. On a division, or in voting by yeas and nays, any member may change his vote before the result is declared.

19. These rules may be suspended by unanimous consent.

Code of Ethics.

ARTICLE I.

THE DUTIES OF THE PROFESSION TO THEIR PATIENTS.

SECTION 1. The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are in most cases unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patients, and even the simplest case committed to his care should receive that attention which is due to operations performed on living, sensitive tissue.

SEC. 2. It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavoring to educate the public mind so that it will properly appreciate the beneficent efforts of our profession. He should encourage no false hopes by promising success when, in the nature of the case, there is uncertainty.

SEC. 3. The dentist should be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which is their right.

ARTICLE II.

MAINTAINING PROFESSIONAL CHARACTER.

SECTION 1. A member of the dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; the aged, special encouragement to their juniors.

SEC. 2. It is unprofessional to resort to public advertisement, cards, handbills, posters, or signs, calling attention to peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public prints, to circulate or recommend nostrums; or to perform any other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by cards, simply their names, occupation, and place of business, or in the same manner to announce their removal, absence from, or return to business, or to issue to their patients appointment cards having a fee bill for professional services thereon.

SEC. 3. When consulted by the patient of another practitioner the dentist should guard against inquiries or hints disparaging to the family dentist or calculated to weaken the patient's confidence in him; and if the interests of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

SEC. 4. When general rules shall have been adopted by members of the profession practicing in the same localities in relation to fees, it is unprofessional and dishonorable to depart from those rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations as an inducement to patronage.

ARTICLE III.

CONSULTATIONS.

Consultations should be promoted in difficult or protracted cases, as they give rise to

confidence, energy, and broader views in practice. In consultations that courtesy and just dealing which is the right of all should be especially observed.

ARTICLE IV.

THE RELATIVE DUTIES OF DENTISTS AND PHYSICIANS.

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the dental organs and adjacent parts. With these he should be more familiar than the general practitioner is expected to be; and while he recognizes the broader knowledge of the physician in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainments in his specialty.

ARTICLE V.

THE MUTUAL DUTIES OF THE PROFESSION AND THE PUBLIC.

Dentists are frequent witnesses, and at the same time the best judges of the impositions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this and many other benefits conferred by the competent and honorable dentists, the profession is entitled to the confidence and respect of the public, who should always discriminate in favor of the true man of science and integrity against the empiric and impostor. The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way without proper remuneration.

SOUTHERN BRANCH.

ELEVENTH ANNUAL MEETING.

TRANSACTIONS

OF THE

SOUTHERN BRANCH

OF THE

National Dental Association

AT THE

ELEVENTH ANNUAL MEETING

HELD AT

Birmingham, Ala., May 12–14, 1908.

OFFICERS.

President—A. R. Melendy, Knoxville, Tenn.
First Vice-president—L. P. Dotterer, Charleston, S. C.
Second Vice-president—A. M. Jackson, Macon, Ga.
Third Vice-president—E. G. Quattlebaum, Columbia, S. C.
Recording Secretary—C. H. Frink, Fernandina, Fla.
Corresponding Secretary—W. G. Mason, Tampa, Fla.
Treasurer—B. D. Brabson, Knoxville, Tenn.

EXECUTIVE COMMITTEE.

V. E. Turner, *Chairman,* Raleigh, N. C.
J. P. Gray, Nashville, Tenn.
B. Holly Smith, Baltimore, Md.
J. E. Chace, Ocala, Fla.
R. W. Carroll, Beaumont, Tex.
J. A. Hall, North Birmingham, Ala.

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ELEVENTH ANNUAL MEETING

OF THE

National Dental Association—Southern Branch,

HELD AT

BIRMINGHAM, ALA., MAY 12, 13, and 14, 1908.

FIRST DAY—Tuesday, May 12th.

THE eleventh annual meeting of the Southern Branch of the National Dental Association was held in Birmingham, Ala., May 12, 13, and 14, 1908, in the Assembly-room of the Birmingham City Hall.

The meeting was called to order Tuesday morning, May 12th, by the president, Dr. A. R. Melendy, Knoxville, Tenn., at 10.30 o'clock A.M.

Invocation of the divine blessing was made by Rev. Dr. J. W. Stagg, Birmingham.

The Rev. Dr. Stagg also delivered an address of welcome to the society on behalf of the state of Alabama.

The association was welcomed to the city of Birmingham by Hon. G. H. Estes, mayor *pro tem.*

Dr. L. F. LUCKIE, Birmingham, Ala., on behalf of the Alabama State Dental Association, delivered the following

Address of Welcome.

Mr. President, members of the association, ladies and gentlemen,—After listening to the very cordial welcomes which you have received on behalf of the state of Alabama and the city of Birmingham, there is nothing left for me but to speak a few words of welcome on behalf of the Alabama Dental Association and welcome you to what small hospitality and good-fellowship we are able to provide.

It will no doubt occur to the laity to ask the question why these people who are called doctors of dental surgery or dentists meet in annual session and are entertained in the different cities of the country. Of course, Mr. President, we

are called other things at times by our patients and often get a blessing that we do not deserve, although we put the dam in the mouth of the patient. By some we are consigned to other regions. You know a great many people believe that we continue in the same relation in the hereafter as in this world. I should not like to think that the dentist will go where there is wailing and gnashing of teeth, and only the patient wear the golden crown!

Mr. President, dentistry is the most misunderstood of all professions, and the public does not know the work being done by this profession for humanity. Therefore it is meet for a dentist to be placed on the list of speakers to give welcome to the members of this association, for he knows of their struggles, their successes and their failures, and the good work they are doing for the benefit of the race. The dental profession stands second to none in charitable work. Free clinics are being organized for people unable to pay fees for dental services. An educational association has been organized to teach oral hygiene in the schools and to the people. The dentist is the most poorly paid of all professional men, yet, never discouraged nor disheartened, looking forward to the dawning of a brighter day when he may receive a fee commensurate with his services, he organizes associations that he may meet with his fellows and exchange ideas on all branches of dentistry—take a post-graduate course as it were—that he may be able to render better service to his patients. So the main object of these meetings is one of education. Of course there is a social side which we enjoy very much. Some may criticize us for our levity, ours being a dignified profession, but

Most of us like to be reckless and free
Once in a while,
And dance down the lane where the foolish folk be
Once in a while.
Most of us like to cut loose from the grind,
Leaving ambition and duty behind;
To necessity deaf and to dignity blind
Once in a while.

Most of us like to forget we are proud
Once in a while,
And get out and cut didoes in front of the crowd
Once in a while.
But the trouble with most of us under the skies
Is that we are foolish in other men's eyes,
Except in rare moments, and only are wise
Once in a while.

Mr. President, we are still in the dawn of the new era for the dental profession, and the members of this association have taken hold of the problems which confront them.

For all that I know you to represent, I welcome you to this city of cities and its hospitality. We have been impatient for your coming, and I feel honored that I can welcome my brothers of a profession that stands second to none.

In bidding you welcome, we wish that your stay with us may prove both beneficial and enjoyable. All that we have is at your disposal. When you bid us good-by and have returned to your own hearthstones, we wish for you continued success in your work. May the acquaintance formed at this meeting ripen into everlasting friendship, and at future meetings—and may you be spared for many!—may hearts grow warmer at the sound of familiar voices and the sight of genial faces!

Words never fully express what one feels, but could you look into our hearts

you would find there a cordial, generous welcome.

Response to Addresses of Welcome.

On behalf of the association, Dr. Wm. Crenshaw, Atlanta, Ga., responded to the addresses of welcome as follows:

To respond to an address of welcome in Alabama comes easy, and it is this time left to a prodigal son. The spirit of hospitality so characteristic of Alabama, the goodliest of the states in the southern sisterhood, is known and recognized the world over, and the Birmingham spirit has not a little to do with this.

In the last days of March 1865, I camped on this spot with a detachment of Wheeler's and Forest's cavalry, retreating tolerably cautiously before Wilson's mounted infantry, which was marching through this section to Selma. We kept out of Wilson's way until he came to Selma, and when we saw that it was his intention to go into that city, we still kept out of his way. But when he captured Selma it was a little bit like a house-party without the guests.

It is only sixty miles from Selma to Montgomery, but leaving Selma at about sundown and rounding up at Montgomery the next afternoon at four, it seemed to me I had traveled three hundred miles, and the record I made on that trip, over that circuitous route which was too far south, eventually resulted in the naming of a county after me after the war, and that county still bears my name.

While I was a student in Baltimore in 1868-69, the teacher of physiology informed us one day that a man carried in his blood from eight to twelve grains of iron. I told Westmoreland, my roommate, what the teacher had said, and asked him if he believed it. He said yes, but in some instances he believed it was brass instead of iron, and in others that it was *steel,* as he had just lost a set of extracting forceps.

Iron gives richness, tone, energy, and enthusiasm to the blood. It was the iron in the blood of the dental profession of Alabama that enabled it to organize the first dental society in America, and it was the iron in the blood of the dental profession of Alabama which enabled it to push to a successful issue the passage of the first dental law in the United States, resulting in establishing the status of dentistry. It is also the iron in the hills and mountains of Alabama that pulsates through the commerce of the world, as it is the iron in the blood of Birmingham that offers us this welcome today.

Dr. A. T. Reeves, Selma, Ala., president of the Alabama Dental Association, was then invited to take the chair, and the president, Dr. A. R. Melendy, read his annual address. (See following page.)

PRESIDENT'S ADDRESS.

By A. R. MELENDY.

Members of the Southern Branch of the National Dental Association, ladies and gentlemen,—My feelings as I stand before you this morning are a mixture of pride and of pleasure. I am proud of the high honor you have conferred upon me in selecting me as your presiding officer upon this occasion, and I am sure that I am voicing the sentiments of each one of you when I say that I am proud of my profession, proud of her attainments and progress, and proud of the culture and high standing of those who constitute her membership.

It gave me great pleasure and made my heart glad when I found that we were to come to the grand old state of Alabama for this meeting. From the very first letter of invitation received from the president of the State Society there has been a cordiality and warmth of feeling, together with a willingness to work hand in hand with the officers of the Southern Branch, which is seldom manifested between two organizations, and I assure you that in this instance it is fully appreciated. We shall always regard the profession in Alabama as worthy of our special honor and esteem, and it gives me great pleasure as I look into your faces to feel that we are friends; that this is not merely an aggregation of scientists assembled for cold-blooded discussion of deep scientific problems, but that it is one of men as well—men with the red blood of human kindness coursing through their veins, furnishing the fuel which keeps the heart warm and filled with love toward all mankind; men whose hopes and ambitions are ever striving forward and upward to higher and better things.

"Have a clear ideal" was the counsel of a wise man—and have it by all means in your power, often in your sight, not as a model for imitation, but rather that you may catch the true spirit and be what you approve.

Every extension of human knowledge extends the bounds of our conscious ignorance. All that we find shows us how much more we have been missing than we had any idea of missing. All increase of knowledge and experience accordingly makes true men more simple and more open-minded. It prepares us to welcome even more than we have yet received. Photographs of a wireless telegraph station show the receiving wires luminous, and a glow of light around the station. This light is unseen by the naked eye, but the photographic plate, long exposed, reveals it. The knowledge that it is there convinces us that there is more that we

do not know, and confirms the faith that beyond all our present knowledge, vaster knowledge waits for us:

> Let knowledge grow from more to more,
> And more of reverence in us dwell!

The work of preparation for this meeting has been necessarily crowded into a very short period of time. The several committees have been much hampered by reason of this fact, and deserve special thanks for accomplishing so much.

It has been three years since we have had a meeting, the last regular one having been held in Memphis in 1905. In 1906 the parent association met in the South, and our session was merged into their meeting, and in 1907 we gave up our own meeting in the interest of the Jamestown Dental Convention. Meeting in this desultory way is, of course, unfortunate, and would soon bring about disintegration; the circumstances of the last few years, however, may never again occur. By reason of these conditions I have made a special effort to thoroughly advertise this meeting in a way that should prove helpful to the association and to the profession at large. An invitation has been extended to more than eighteen hundred members of state societies throughout the South by means of a personal letter, and in order that this invitation might be more fully appreciated, I secured for it the indorsement of Dr. William Carr, president of the National Association, and of Dr. H. J. Burkhart, chairman of its Executive Council. This personal invitation, together with the appointment of very small committees, constitutes the only radical departure from our usual methods in preparing for this meeting.

About April 10th I was able to send out a preliminary program, enough material having been promised to insure the success of the meeting, and instead of our publishing a complete program later, it has been deemed best to print a daily bulletin, showing as nearly as possible the exact work for the day. This I hope will economize the time of this body and meet with your approval.

There are some steps of marked progress being made from year to year which I think it would be well for this association to commend.

First. The higher standard established in our dental colleges by the institution of an advanced entrance examination and a three-years' course of study. This standard, I have reason to believe, is not merely one in theory, but is being very generally maintained by all our colleges, and I feel that a resolution of encouragement and approval might be the means of furthering this good work.

Second. The examining boards in most of our states have been untiring and unselfish in their labors, and in many of the southern states within the past two years the laws governing the practice of dentistry have been greatly strengthened and improved. This is due largely to the influence of the examining boards, backed up by the state societies. These amended laws bring our states more nearly on a parity and make possible an interchange of state license in the not far distant future. This I deem a great step forward, and would recommend that this society take some action which shall indicate its approval.

Third. The great importance of the Legislative Committee's work at Washington, more familiarly known as the Army and Navy Bill, should not be passed by without some consideration. True, this matter is under the direct supervision of a committee appointed by the

parent association, but it is of such vital importance to the profession at large that I should deem myself false to the trust put in me if I failed to call your attention to this matter. It has been a long, hard fight. Dissensions and jealousies from within and without have at times weakened the effort put forth. But though we regret all this, there has still been made an honest effort, and much time, thought, and labor have been spent upon it. May we not, then, voice our approval of the struggle on the part of the national body, and urge them to keep up the fight until the victory shall be won, and dentists shall be placed in both the army and navy with the same rank and honor as that accorded to the physician or surgeon?

Fourth. Our relationship to the national or parent body has been so cordial that comment is unnecessary. There is, however, a growing sentiment among the members from all over the country that the membership should be greatly increased until it numbers many thousands instead of hundreds, becoming thereby more national in its scope, more powerful in its influence, and more fully representative of the profession at large. The medical profession is successful in maintaining such an organization, together with the publication of its own medical journal, and this matter may crystallize at any time within our own profession.

Last year, at the meeting in the Western division, more than twelve hundred dentists were registered as present—a splendid representative body of the great Northwest. Next year we shall have the national meeting in the South. May we not at this time inaugurate a movement which shall insure for the national session in 1909 the largest gathering of dentists the world has ever seen? Such an undertaking is entirely within the possibilities of the Southern Branch, and would be epoch-making in its influence upon the profession throughout the South, and world-wide in its interests. I say it is possible, and would suggest the selection of a committee of five or seven wideawake and thoroughly interested men to represent the branch in every particular, placing at their disposal a part of the funds remaining in the hands of the treasurer after payment of the expenses of this meeting, and giving them entire charge of the arrangements, directing them to work conjointly with the officers of the National Association.

I have thus briefly endeavored to note a few important features engaging the thought of the profession of today, and, not wishing to waste any of your time, which I feel might be more profitably employed, I now thank you for your kindly consideration and attention.

Motion was made and carried that the President's address be referred to a committee of three for consideration, with the request that a report of the address be made at a later session.

The chair then appointed the following as the Committee on the President's Address: Drs. G. S. Vann, S. W. Foster, and F. A. Johnston.

The President resumed the chair, and announced as the next item on the program a paper by Dr. A. H. Thompson, Topeka, Kansas, on "Anthropology and Dentistry," which was read by Dr. J. P. Gray, as follows:

Anthropology and Dentistry.

By ALTON HOWARD THOMPSON.

ANTHROPOLOGY is the science of man, the natural history of our own species, by which man is studied like other animals. As Prof. E. B. Tylor says, "In the general classification of knowledge, anthropology stands for the science of man, the highest section of zoölogy, which is the science of animals. Zoölogy in its turn is the highest section of biology, which is the science of life." Anthropology is therefore the highest department of the science of life. Simple as this definition is, it is not always grasped by students, who do not comprehend the oneness of all life and the interrelation of all living beings. All life is but a unit. Man is but a part, a very insignificant part, of nature. His species constitutes the merest fraction of the great aggregation of living beings that have inhabited this planet. He is not a superior creation, but is an animal like other animals of high and low degree. He has not a separate kingdom of his own, but is a vertebrate like other vertebrates. He has no class exclusively his own, but is a mammal like other mammals. He has no order of his own, but is a primate like the apes and monkeys, and the sub-order of the *anthropomorpha* includes the higher apes as well. He has indeed a genus of his own, in which he is the only species, *Homo sapiens*. So nowadays, as Dr. O. W. Holmes puts it, "Man is studied like the rocks and stars," by the scientific and comparative method.

M. Paul Broca says that the word anthropology is of ancient date and has always signified the study of man—first of man moral and then of man physical. Aristotle may have been the originator of it, as he termed those anthropologists who carried on dissertations upon man. Magnus Hundt employed it in 1501, and Kant applied it to psychology, but Blumenbach gave it the meaning which it has today. In 1838 it was defined as the natural history of man. The Anthropological Society of London stated that its object was—"The formulating of the study of man in a scientific manner, taking his leading aspects—physical, mental and historical; to investigate the laws of his origin and progress; to ascertain his place in nature and his relationship to the inferior forms of life, and to attain these objects by proper study and investigation." As Prof. Otis T. Mason well said years ago, "It is the study of man from the standpoint of the naturalist, who investigates his objects, be they stars, rocks, plants, animals, or man, by the strict application of scientific methods of inquiry. Viewed in its entirety, anthropology is perhaps the most comprehensive of the sciences, as it includes all that man is and all that he has done."

SUBDIVISIONS OF ANTHROPOLOGY.

The science of anthropology is specifically divided into two great branches: (1) Physical Anthropology, which considers man as a biological unit, an animal—his anatomy, physiology, form, and

features and all the phases of his physical being; and (2) Cultural Anthropology, which embraces the vast range of human achievements, the products of his hand and brain. As Prof. W. H. Holmes puts it, "If the physical qualities of man includes all that connect him *with* the brute, his cultural products, the work of his hand and brain, includes all that distinguishes him *from* the brute. If we wish to realize more fully the scope of the latter division of the subject, we have but to sweep away in imagination all the myriad things that he has brought into the world, destroy every city, town, and dwelling, every tool and weapon, all clothing and the use of fire, banish all language, government, religion, and social organization—in short, remove every product of mankind, every trace of his handiwork; and when this is done we may behold the true man standing in his original nakedness among his fellows of the brute world."

The first—Physical Anthropology—has been subdivided into many branches which are great sciences in themselves. Thus we have—(1) *Anthropogeny*—the origin of man, his condition in the earliest known stages of his existence, his geological history, his zoölogical relationship and resemblance to lower forms; (2) *biology*—man's anatomy, morphology, anthropometry, physiology, pathology, etc.; (3) *ethnology*—the races of mankind, the ethnography and migration of races, the principles of racial differentiation and their physical characteristics, etc.; (4) *psychology*—the phenomena of the human mind and its processes, the organic basis of thought, etc. These great divisions cover the field of what man is in all that concerns his physical being.

Under the second head—Cultural or Functional Anthropology—is included all that man *does,* the products of his hand and brain. Its main divisions are —(1) *Archeology,* which describes geologic and prehistoric human products and the conditions of life before the historic era; (2) *history*—the narration of the progress of the human race by tradition and written records, since the emergence from the prehistoric era; (3) *glossology* —language and other modes of expressing thought; (4) *technology*—the knowledge of materials, tools, and weapons, and the methods of using them that man has discovered and employed to supply his wants; (5) *esthetology*—the taste for art and decoration, the desire for the beautiful in art; (6) *science and philosophy*—the ideas and theories by which man accounts for the phenomena of nature and of life; (7) *sociology*—social organization, government, institutions, etc.; (8) *religion*—the ideas of man in regard to spirit life and the life after death, superstitions, religious ceremonies, etc. These things distinguish man from the animals below him.

RELATION OF ANTHROPOLOGY TO EDUCATION AND TECHNICAL TRAINING.

With these considerations there is coming to be a conviction that this great science should be at the basis of all education, even of the special training for the technical industries. What is more natural or scientific than that we should found all education upon the origins of every branch of human achievement—beginning with these and bringing them up historically to their latest development? This anthropology furnishes us under the names of evolution and archeology. It demonstrates the primeval origin of all things human and traces their evolution

up to present conditions. A study of the origin of human institutions will have a wholesome restraint upon the vainglory and pride we have in modern discoveries, showing how many of the alleged new things are really old. It is broadening to the human mind to go back to the beginnings of things, to know the origin, archeology and evolution of every branch of human learning, and this anthropology will furnish to us. It augments our respect for our race to have a better acquaintance with its achievements in the past, and teaches us a wholesome lesson in humility when tempted to boast of the much-vaunted progress of our day. Comparative study is the only key to that breadth of mind which characterizes the true scholar, since narrowness is the chief characteristic of the old-fashioned specialist, who had a contempt for all knowledge outside of his own limited field. It is very apparent that the great and comprehensive science of anthropology has an important bearing upon every department of human life and is of value in everything that man is and does. It is a sort of clearing-house where students meet on common ground to exchange knowledge and to compare their various outlooks upon life and the progress of the human race.

It becomes us, then, as a limited specialty of the great science of medicine —which is a branch of anthropology— to inquire what the great human science has done for us, and what we may yet learn from it that will enlarge our mental horizon and enable us to be more useful to our fellow man. We are indebted to medicine for our knowledge of anatomy, physiology, and the pathology of modern man, but anthropology carries us beyond these fundamentals back to their origin, and thence, like all archeological studies, casts light upon their evolution and illuminates the meaning of their essential features. To human somatology and morphology it is especially illuminating, showing how modern man has come to be what he is in his anatomical features. To us this is especially important in the study of the jaws and face, showing how their present condition in modern man was attained, by comparing them with the same parts in primitive man and in lower animals. This leads to evolution, to which we owe so much, both through phylogeny—geological evolution—and its correlative and companion science—embryology. I need scarcely remind you of the importance of the anthropology and evolution of the teeth, the pursuit of which leads us into fields where great biological problems have been discussed which bear upon the origin and evolution of the race.

In the special field of ethnology we have much to learn regarding the variations of the face, both as to its osteological structure and to the features in different races. The ethnology of the facial contour and the features of expression are of importance to us, and have received but little attention in our ranks. Faces vary so much among such a mixed people as the Anglo- and Hispano-Americans, where there is such a conglomeration of races that there must be some relationship between these two great facts, if we could but unravel the tangled skeins. Typic faces are constantly reappearing which undoubtedly hark back to primitive types, in accordance with the law of atavism, which if we could but read the indications aright would do much to help us to understand the mysteries of heredity. The persistence of type is so marked in some persons, in spite of extensive intermixture, that we

long to read its story. In addition to this, we need more knowledge of the ethnology of the teeth themselves and of their variations as to race. It must be that the variations have some meaning and that there are some racial features that are constant. A glimpse into this great field but whets our appetite to know more of these mysteries. We need also to know more of craniometry and the relationship of skull shape to the jaws and face—as well as to have more knowledge of anthropometry in general as applied to the head and face as bearing upon the scientific classification of these parts. It goes without saying that a knowledge of the anthropology of physiology would be of great value to us, especially when dealing with the food habits of ancient peoples and the effects of foods upon the development or nutrition of the body.

These and other questions of the biology of man which have a bearing upon our specialty would illuminate many dark corners and give a spice and interest to many a dry subject which fails to attract not only the young but as well the mature student.

We are also interested in cultural anthropology. Archeology, for instance, describes the primitive conditions of human life that have affected the environments of man and have made him what he is. The archeology of food habits has a direct bearing upon a proper knowledge of the teeth and jaws and their evolution. If function controls the evolution of structure—which is a fact demonstrated by all nature—then indeed must the food habits of primitive man have had a paramount influence upon the evolution of the teeth and jaws. It goes without saying that the artificial preparation of the food since that time has had a degrading effect upon these parts and is the principal factor in inducing their present degeneracy. The environments, also, of primitive man in other respects have had various effects upon the oral structures which call for investigation and study. A knowledge of various primitive customs is necessary, as bearing not only directly upon the teeth and jaws, but also upon collateral organs. Thus the usurpation of the function of prehension by the hands and the use of weapons by primitive man was the cause of the reduction of the canine tooth as a tool and weapon. As a tool-using animal man did not require the long trenchant canine like the carnivora. The jaws and face are embryonic in man because of the development of the hands for prehensile purposes. The collateral development of the brain took place with the growth of the tool-using instinct. It is an old and true saying that "Man is the wisest of animals because of his hands."

DEBT OF TECHNOLOGY TO ANTHROPOLOGY.

In the field of technology we owe an immense debt to anthropology, for it is by means of technical skill that we have come to be what we are in the service of humanity. Startling as the statement may appear, it is a fact that the practice of our calling is based upon the first discoveries of primitive man in the use of tools and upon the reduction of the crude materials furnished by nature which man adapted to his simple wants. If the psychic emergence from the animal stage was due to the evolution of the tool-making power, which is an apparent necessity, then this was the beginning of all human industry. As M. de Pressensé says in his "Study of Origins," "The first tool fashioned by man asserted his royalty over nature. Thus the tool is man's

first scepter; whether it was made of wood or flint or bone, it was the result of thought. This is why the animal, guided by instinct, can effect marvels of construction by the use of its own limbs, but it never makes a tool. A monkey may have chanced one day to lean upon a stick, but he did not cut or shape the stick nor hand it down to posterity that they might improve upon it."

From the point of the psychic emergence, the evolution of the ancestors of man must have been rapid as compared with lower, unendowed animals. In the struggle for existence the immense advantage which even a little mental superiority conferred led to immediate success in the conflict and subsequent domination. This early superiority is evidenced by the fact that artificially formed stone implements have been found in early geological horizons, where their presence certainly indicates the presence of a being which had advanced beyond the animal stage, for no animal manufactures tools. As Pressensé again says: "From the earliest days, man advanced along the path of progress. The very fact that man makes a tool holds in itself all his future, for before he shaped the stone against which he struck his foot as it lay in his path, he must, under the stimulus of want, have formed first the idea that he could make it useful by adapting it to his necessities. Prehistoric man took possession of the future for himself and for his descendants the day when by his own efforts he made for himself a tool or weapon." From such an origin, such a beginning, the tool-making faculty was developed, and the progress of humanity has kept time with this development. Evolution proceeded very slowly at first, but by adding thought to thought and tool to tool our primeval ancestor gradually attained the stature of a man, and was forever differentiated from the beasts. It is interesting for us to consider that from such beginnings the technology of our calling arose, with all its elaborate armament and pride of technical skill, and it would be well to trace back its evolution to the real origin in the infancy of the race. Such studies would teach us to know ourselves better and to revere the past for such teaching.

ANTHROPOLOGY AND ESTHETICS.

In the department of esthetology, also, the study of art and of the beautiful, we have much to learn by appealing to anthropology. The origin and history of art as exemplified in painting, sculpture, pottery, etc., are of especial interest and value to us as bearing upon the harmony of forms with which we have to deal so much. One reason of our deficiency in this field is our lack of knowledge of the origin and the evolution of artistic forms and motives. From the earliest indications of art as found in the carvings of bone and ivory and the wall paintings of the caves of France in glacial times or the stone images of early geological ages, down through the long centuries, along the continuous chain of the evolution of the artistic sense, as indicated in the creations of Assyria, Egypt, Greece, India, China, Japan, Mexico, Peru, there is a world of artistic material awaiting our utilization. That we do not know of these things is no reason for our remaining in unappreciative ignorance of them. It is stupid and wasteful not to know them, for a knowledge of the origin and history of any branch of human learning saves much time and effort in ignorant groping and guessing for the explanation of things. Such knowledge

would increase our usefulness and enlarge our lives. The cult of the beautiful is part of our soul life; without it we do not attain to our full stature. It is the extra, the outside consciousness that takes us outside of ourselves. It is the awakening of this extra consciousness that causes the thrill that we feel when gazing upon a beautiful work of art or a beautiful sight in nature. We are thereby enlarged in soul and life, and what is more rational than to cultivate this faculty? We feel the sense of the beautiful, but it must not be identified with the emotions alone. Beauty is inseparable from the good and true in life, and is therefore ethical as well. No true artist can be base in his thoughts and desires. While beauty is in the things that can be seen and heard, that by their harmonies take us outside of ourselves, yet in esthetics, as in other departments of human experience, we cannot take away more than we take to it, *i.e.* we must study and develop ourselves for the highest attainment of the utilization and enjoyment of the beautiful. Considering this as the philosophy of the beautiful in art, what would be more rational than that we as a profession, of whose work harmony and beauty of form is an essential part, should go back to the origin of art for our inspiration, and by progressive study of its evolution through its varied forms attain a better understanding of its meaning, and also, incidentally, of its technique. This understanding anthropology will give us, and we should take advantage of its teachings.

But I hope that I have said enough to illustrate the value of the great human science to us both directly as bearing upon our work and indirectly as enlarging our lives and thereby making life more worth living. As the editor of the *Outlook* has recently said, "Nothing could be more superficial from the educational point of view, or dry up more rapidly the sources of educational inspiration, than a perfectly 'up-to-date' education, as some people understand up-to-dateness which has nothing to do with yesterday and therefore nothing to do with tomorrow, but concerns itself only with fitting men to do the work of this particular hour. For practical training there is an increasing demand that should be and is being met. But an education that trains men only to make a living and does not fit them to make a life saps the very sources of inspiration and makes a monotonous workshop of the modern world. The present is built upon the past, and one of the chief uses of education is to show a man where the world of his time stands."

Let us take our measure, therefore, and adjust ourselves to the progress of the human knowledge in all branches where directly or indirectly it can be of benefit to us.

Discussion.

Dr. I. N. Carr, Durham, N. C. I hesitated about rising, because I did not want to be the first to open the discussion on the paper for two reasons: first, because I did not want to make myself conspicuous, and second, because the paper is rather deep for the ordinary man to comprehend. One of the great poets tells us that "The proper study of mankind is man," which includes both soul and body, but the essayist has told us that the greatest study was the body. There are one or two things in the paper that I think should be spoken of and not acceded to, because I do not think they are correct. I am one of those who be-

lieve that psychology is the science of the soul, as the term implies; that the mind is a part of man, and not man a part of the mind.

I wish to commend the paper because it shows deep research into the subject, and I congratulate the essayist on his effort. I simply wanted to open the discussion, as I did not want such a valuable paper to pass without discussion.

Dr. J. P. Gray, Nashville, Tenn. I do not think that a paper of this kind should go by without discussion. It is one of the most important papers from a thoroughly scientific standpoint that has been read before this association in years. It is true that it treats of a subject with which most of us are not familiar, but if we take up the study of anthropology we can learn much of the relations of the human features with environment and heredity. I feel sure that environment in the past hundreds of years has had much to do with the degeneracy of man; I do not mean theological degeneracy when I speak of degeneracy, nor do I mean theological evolution, as we are accustomed to associate the two. I am convinced of the degeneracy after studying some of the skulls and heads of the races—Indians particularly, and among these the Flathead Indians—of which we are not sure at what period they lived here in this country, but only know that they far antedate our own tribes and the tribes that inhabited this country when we landed here. If we go back to the prehistoric ages of primitive man we shall find that these men or peoples had a typical face. I examined some thirty or forty skulls and bones of the faces of these tribes, and they are almost exactly alike in shape, size, and form. They have not lost any of that symmetry that was the original birthright of the human race. Their jaws measure practically the same in every instance, going beyond what was designated by Dr. Bonwill as the typical jaw of four by four inches, and reaching five inches and even more, but always preserving perfect symmetry. Take modern man, and we do not find that the same is the case. We find man's jaws and the bones of his face degenerated, losing that strong, firm condition that these skulls had. Modern skulls vary widely, they are short near the angle and the bone is elongated. Possibly both angles are short and the body of the bone is normal, or they may be short on one side and long upon the other. Not so with these primitive men, as has been the experience of a number of men who have studied this subject and have examined these skulls from times far distant. As time goes on, and skulls change more and more, it behooves us to study the causes of this.

Now, as to what our essayist says of environment, we do not need the strong healthy jaws that were needed by those Indians I spoke of, because we live on different food and under different conditions. Go, if you please, among the tribes of the Indians of today—I mean whole tribes—and you will find that their skulls are of almost perfect symmetry, not only the bones of the mandible, but all the bones of the face, and especially the maxillary bones; and this is where the most trouble arises, for it is not the change in the mandible but that in the maxillary bones which is troubling us, and we have to do something to overcome this in some way. We have to get a perfect alignment of the maxillary and correct these deformities, and it behooves us as dentists to study the past conditions in order to make a correct

comparison with the jaws of the present day. I do not know whether heredity has much to do with it or not, possibly it has, but I am sure that environment is an important factor. You may study the faces around you every day and you see some with symmetrical arches and others with abnormal conditions on account of the development or non-development of the brain structures. The function of the brain is that of presiding over man, and as the result of any overbalance or underbalance the brain is going to have its effect upon the body of the man.

Dr. G. V. I. Brown, Milwaukee, Wis. We are to be congratulated upon beginning the meeting with a paper from Dr. Thompson, just as the profession has been entitled to congratulation for a good many years in having had him to keep alive the interest in this subject, which I am inclined to think many would not have taken in it if it had not been for the essayist.

What my friend Dr. Gray has said, in giving a practical valuation of this paper, is unquestionably true, and during this meeting I hope to call your attention to a method by which I have been trying to produce in orthodontia the results the essayist speaks of. I believe that many of the affections which he describes are due to conditions of development of the maxillæ, and this we can control in a large majority of cases. The point in this paper most interesting to me was that the essayist tried to present the subject with a view of giving the practical value of the knowledge of these allied subjects, not alone of anthropology as we regard it in dealing chiefly with the animal life, but of this science in its bearing upon all science. This is of particular interest just now in view of the fact that during the last few years, since radium came so conspicuously into prominence, and since the result of investigations into the action of radiation to which its study led, several new elements have been discovered. We know now that that which emanates from radium and gives it so many influences and powers eventuates in the decay of the radium, changing it into something of a much lower, less valuable, and less interesting nature. We understand now that gold, copper, and such metals as have been looked upon as fixed, are in their turn undergoing in some degree, not to such an extent as radium but at least measurably, a process of destruction. In the theory of evolution we usually start with the proposition that man develops upward, and too little is thought of the fact that there may have been a downward development. I do not mean atavism, but I mean changes in the nature of those of radium. When it decays most rapidly it gives off that which is of greatest usefulness, and at the same time it is approaching more rapidly its own ultimate destruction. So man, when he accomplishes that which is best, gives off that which is most useful; when he reaches the highest type of development, he is decaying. Decay of the teeth, the decay of other structures, is in part an evidence of the general tendency toward man's own dissolution. And this, in a general way, indicates the value of the paper, as showing the absolutely inseparable relation of these organs which we are accustomed to look upon separately, not only to other organs and parts of the human organism, but to other and more far-reaching laws; for, whether the study be physiologic or pathologic, the conditions are merely in accordance with one complete system of construction and destruction, the latter

being more marked as man rises in the scale of his sociologic importance, and diseases are therefore more in evidence and more difficult to cure as man reaches the state of so-called higher civilization.

Dr. CHACE called attention to the fact that two of the members of the Executive Committee were absent, and moved that two members be appointed *pro tem.* for the present meeting.

The motion was carried.

The association then adjourned until the afternoon session at 2 o'clock.

FIRST DAY—Afternoon Session.

The meeting was called to order by the president, Dr. Melendy, at 2 o'clock Tuesday afternoon.

The first order of business was a paper by Dr. S. H. GUILFORD, Philadelphia, Pa., on "How Can We Improve Our Nomenclature?" which was read by Dr. Gray, as follows:

How Can We Improve Our Nomenclature?

By S. H. GUILFORD.

No art or science can be considered entirely satisfactory to its followers unless it possesses a nomenclature at least approximately exact and in harmony with philological requirements.

Indeed, exactness in its methods is a prime requisite for a true art or a true science, and if its methods need to be exact and true to fundamental principles, the terms in which those methods are expressed need to be equally exact in order to be consistent. Ambiguity of expression cannot harmonize with scientific procedure. For this reason many departments of human endeavor which have made steady progress toward perfection, after having been satisfied a while with a multitude of terms which, while incorrect, have served a temporary purpose, have in time come to a point where revision of their nomenclature became a necessity.

In some of the lesser arts many of the improvements in method or manipulation have been conceived by the workmen, whose meager early education has not provided them with a large vocabulary, and who, in consequence, have given to new devices or processes names which bear no real relation to them. It is in this way that most of the incongruous and incorrect terms have crept into use in the various arts, and they are not eventually weeded out or supplanted by better ones until a long time has elapsed, and usually some of them have in time become so fixed by usage that they are never entirely eliminated.

We only need examine the terminology of our profession to become convinced that it has proved no exception to the rule. As new terms are constantly being introduced, often by those of marked ability along practical lines but with no idea of philological propriety, the sooner the terminology of our calling is revised and placed upon a scientific basis the better the result obtained will be. The task to be performed in accomplishing this result is not an easy one nor can it be accomplished very rapidly, because we are all creatures of prejudice and are slow to give up that to which we have become accustomed, and which has been taking the place of something that is strange, even though it be better.

HISTORY OF ATTEMPTED REVISION—THE COMMISSION ON NOMENCLATURE.

The first serious attempt at revising and improving our terminology was made by Dr. Black, and the results of his labor were embodied in a paper read before the Columbian Dental Congress in 1893. Like all other work done by him, his report was extensive, complete, and most valuable. It served to call the attention of the profession to the great necessity of a revised nomenclature, and started a movement which will some day culminate in most happy results.

Since that time, work along the same lines has been done by special committees appointed by the National Dental Association and by the National Association of Dental Faculties, while more recently the matter has been taken up by the Institute of Dental Pedagogics, to whom the work more properly belongs. In the last instance the labor has been assigned to a permanent commission which will carry it on to what we hope will be a satisfactory termination. This commission has made two annual reports covering the subjects of operative and prosthetic dentistry, and it is proposed to annually report upon one branch of dental science until all branches have been included. The work is a monumental one, but those engaged in it are both capable and enthusiastic, and it is safe to predict that the work will be well done.

The most difficult problem encountered at the outset by the commission was to decide upon the basis on which the superstructure should be built. The dead languages, Latin and Greek, on account of their unchangeableness have served as foundations for the nomenclature of the older sciences. Botany and zoölogy have built their terms almost exclusively upon Latin bases. Those of biology are principally of Greek origin. Electricity has employed both Latin and Greek terms, while medicine and surgery have terms some Greek, some Latin, and others a combination of the two. The word "medicine" itself is of Latin origin, while "surgery" comes from the Greek.

A terminology that is intended to be thoroughly international or universal in character could have no other basis than that of one or both of the dead languages, for besides their fixedness they are the only ones understood by virtually all civilized nations; and yet to so revise our nomenclature as to place it upon a strictly Latin or Greek foundation would involve such radical changes as to defeat the very object had in view.

The medical sciences have recently undertaken such a revision of their nomenclature through an international commission, and while their work has been well done and their results published in permanent form it remains to

be seen whether its adoption will be quite general or easily accomplished.

The Dental Commission on Nomenclature decided in the beginning that such radical action would not be wise, and while they will give preference to terms formed from Latin or Greek roots, where such are available and not too complicated, they very wisely decided to retain many terms of uncertain parentage that have become established through long use. A few such terms will not materially mar the work as a whole.

As far as terms of recent introduction are concerned the Dental Commission will give decided preference to those based upon a classic or scientific foundation. Since the object of the terms is to intelligently convey ideas, those that serve this purpose best are the ones to be selected. Above all, ambiguity is to be avoided, for whenever a word is variously used to convey different ideas in different relationships it is not, and cannot be, exact and definite.

ILLUSTRATIONS OF UNSETTLED AND ERRONEOUS NOMENCLATURE.

As an illustration, in our terminology we have the terms *articulation* and *occlusion,* which are often used interchangeably. Although neither word exactly expresses the condition we wish to describe, the commission has decided upon the term occlusion as the better one, because it has but one meaning, while articulation has several. So, also, with the terms *absorption* and *resorption.* The former is the older word, but, since it does not correctly describe the physiological process and has other meanings, it has had to give way to the latter one, which is exact and has but one meaning. Again, the term *exostosis* (borrowed from medicine) was long used to describe an enlargement of the root of a tooth, but it was not correct, and has been replaced by the term *cementosis,* which exactly describes the condition. In the same way *periosteum* has been superseded by *pericementum,* while another compound term, *alveolo-dental membrane,* which was designed by its originator to more exactly express the location of this unique tissue, is not only needlessly cumbersome but manifestly incorrect, because instead of being attached to a tooth it is attached only to the root, and in particular to but one portion of the root, the cementum. *Pericementum* is a far better term, for it is simpler and more exact. We sometimes notice in journals the term "ulcerated tooth," but its incorrectness is apparent when we consider that an ulcer is defined as "an *open* sore in soft tissues with secretion of pus," while an abscess is a "localized collection of pus in a cavity." We often meet with an alveolar abscess, but never with an ulcerated tooth or root.

We have been accustomed to speak of the *antrum* of Highmore or maxillary *antrum,* and of the frontal *sinus,* and yet both cavities are anatomically similar. *Antrum* would seem to be the better term, as its definition is "a chamber or cavity in a bone," while *sinus* has two meanings—(1) "a recess, cavity, or hollow space" and (2) "an opening leading to an abscess."

We frequently notice three adjectives used interchangeably—"calcific," "calcareous," and "calcic." They are all three derived from the same Latin root, *calx* (lime), but are not synonymous. "Calcific" means forming lime, as in the calcification of cartilage, but

"calcareous" and "calcic" mean containing lime. The term calcareous is commonly applied to minerals, as calcareous earth, calcareous rock, etc., while calcic is largely restricted to such fluids of the body as contain and carry lime, as the blood and the saliva.

"Bibulous" and "absorbent," as dental terms also require differentiation, the former too often applying to individuals under certain conditions, while the latter denotes only a physiological or physical property. *Absorbent* cotton or paper is therefore a better term than bibulous.

Our supply catalogs speak of cotton "pliers," and gold "pliers," when they mean tweezers. Pliers are composed of two parts working on a joint, while tweezers, as we know, have no joint.

The term "air-chamber" as applied to dentures is contradictory in itself, for the chamber is supposed to be without air. *Vacuum chamber* is the proper term.

I hope to be pardoned for introducing so many examples of incorrect terms, with most of which you are entirely familiar, but I have done so in order to emphasize the importance of a revision of our nomenclature.

It is as easy to use correct terms as incorrect ones, and certainly far better. If all of us will carefully study the reports of the Commission on Nomenclature as they will appear from time to time in the journals, and familiarize ourselves with the terms proposed there, and if, further, the teachers in our schools will adopt the words approved of, and rigidly discard those that are condemned, the question of "How can we improve our nomenclature?" will soon be satisfactorily solved.

Discussion.

Dr. J. H. Crossland, Montgomery, Ala. The subject of nomenclature is a very deep and a very beautiful study, but nomenclature, like so many other things, has always been a matter of compromise. With regard to the derivation of medical words from the Latin and of surgical words from the Greek, I cannot see any objection to that, because if we go back farther we will find that Latin is very largely derived from the Greek itself. As far as classical derivatives are concerned, if all the derivatives could be classical it would greatly simplify research and deepen and broaden the fundamental education of those who make these researches, but in the very nature of things, this seems almost impossible. General literature itself teems with words of uncertain origin. The greatest scholars have failed to discover the origin of a great many of our terms, and it is not very probable that they will ever be able to do so. If we can perfect our dental etymology as nearly as general literature has, this should be satisfactory to us. Dr. Bonwill used to draw a very beautiful distinction between articulation and occlusion. I do not boast of any deep knowledge of this subject, but it seems to me that these two terms should be retained. As I understand it, articulation is of Latin origin, and occlusion is also derived from the Latin language, and I am not sure whether both cannot be traced back to the Greek. Articulation means the forming of a joint, and occlusion means shutting or closing. A door may shut and yet not form a close joint. A set of teeth may occlude, as Dr. Bonwill said, and still not articulate very accurately. While

I cannot go deeply into this subject, I have been very much impressed with it, and it has seemed to me that these two terms should remain in our literature.

Dr. G. S. Tignor, Atlanta, Ga. This is a question which, if we are ever to come to any sort of settlement on the basis of adequate language or adequate nomenclature, we shall have to take up at the very outset of our dental education. In other words, we must require of applicants for admission to the dental schools a thorough knowledge of our mother tongue; and if such applicants are not thoroughly familiar with the mother tongue it is going to become the duty of our institutions to endow an English chair. Not one of us speaks our mother tongue today; not one of us can understand it when we read it or understand it when we hear it. If we try to read Anglo-Saxon today, we find something which is about as unintelligible to us as Greek or Latin. If you trace the English language from its emanation from the Anglo-Saxon language, you will find that first Greek and then Latin have largely influenced its development. These two languages have always been and will continue to be the basis of nomenclature for all scientific or classical subjects, and we will not be able to get away from it. Greek is the natural idiom of science, and Latin the legal dialect of public transactions. But it is a peculiar fact about the Anglo-Saxon language that wherever it has gone it has consumed, it has absorbed the languages with which it has come into contact.

Language is the expression of thought, and as long as we continue to think we will have new expressions and new words. Restricted and barren language indicates barrenness of thought. The more scientific and progressive a profession, the more complicated its nomenclature will seem, because of the abundance of its expressions and the delicate shades thereof. In the early stages of a science its expressions are marked by imperfection and clumsiness, but in its more advanced stages its beauty is delineated by the most delicate detail in nomenclature. Slang is good when it expresses a new idea. Nothing can express a thing so forcibly in certain localities as some slang expression which has gained circulation, and that slang is destined to become good English wherever it goes beyond the particular province or section where it was originated. It is merely the survival of the fittest that is going to constitute the classical in language. Every time we invent any sort of an appliance, it receives a name. Every time we develop new ideas or processes we give them new names, and we will never arrive at any sort of fixed nomenclature as long as thought is active and as long as inventions continue. We have simply to follow the process of the English language of absorbing everything that is best fitted for expressing the idea.

This is an excellent paper as far as it goes. It is a plan for culling the language; in other words, leaving out terms that are not quite fit, that have possibly not come up to our expectation in expressiveness. Such words as do not fully describe a process will be entirely supplanted by expressions that will. This seems to be the policy of this paper, but if we would be successful we shall have to take hold of the root, and our students as they enter college must be required to have a thorough knowledge of our mother tongue. If they do not have this knowledge, then it will be a very excellent innovation for our schools to introduce a course of English into the cur-

riculum of the dental student's education. Then the nomenclature of our profession will be very much more classical, scientific, and expressive. I do not believe, however, that we shall ever arrive at any absolute, fixed, definite nomenclature. Just as a process or material goes into disuse, so these expressions will become obsolete, but we can improve our nomenclature along these lines by using what is most classical and most accurate, thus following the law of the survival of the fittest in the case of expression.

Dr. R. C. Young, Anniston, Ala. The author of this paper is a gentleman for whom I have great regard and love, and he has been studying this gigantic problem for a number of years.

To conquer a nation is a simple matter provided one is stronger than another, but to change the language of that nation is quite a different proposition. The Russians found that it was easy to conquer and absorb the Polish nation, but when they attempted to change the Polish language they found it impossible, even though they went so far as to make it a criminal offence for anyone to speak the Polish language, even in his home.

Our nomenclature is perfectly satisfactory. It is not a question of where we get words from, but it is their meaning that we are concerned with. Take the words resorption and absorption, two words absolutely of different meaning, yet so often used as synonyms. Nature resorbs what it deposits, for instance, in the resorption of the roots of deciduous teeth; in the resorption of the products of inflammation. A swelling may be resorbed. In other words, nature takes back what it has given out. In the case of absorption, nature simply takes up, as a sponge would take up water—for instance, iodin and aconite are absorbed when painted upon the gums. The two words ulitis and gingivitis are often used as synonyms, while in fact they are just as different as a negro and a mulatto. The first term expresses inflammation of the gum, the other applies to inflammation of the gingival margin of the gum. One may attempt to express a condition and use the wrong word, yet this is not the fault of our nomenclature, but the fault of the man who attempts to express himself.

The essayist has done a great deal for the dental profession in his book on Orthodontia, in his essays, and in his work on this gigantic problem of nomenclature, which is not a new problem at all. The subject has been pretty well threshed out and it seems to me we might as well pass to another paper.

Dr. I. N. Carr, Durham, N. C. I cannot say that I quite agree with Dr. Young in wanting to dismiss the subject. I do not believe that there is any subject before the National Association today that is being thought out more thoroughly than this subject of nomenclature. Dr. Wilson of Cleveland, at the national meeting in Minneapolis last July, read a paper on the subject which was very extensive, and wherein he showed that we had been incorrect in using a great many terms familiar to us all. Many remember, for instance, the way in which we used to apply the word "periosteum." Now we use the words peridental membrane and pericemental membrane, the Latin adjective designating the meaning. We used the word periosteum, which means the membrane that covers every bone in the body, but we now designate the root-membrane as the peridental membrane. I think the work that is being done along this line by men who

are giving a great deal of attention to that subject is well worthy of our consideration and approval. As far as I have been able to learn we have made a great deal of progress along that line, and our nomenclature today is much more simplified than it was heretofore. And while I think Dr. Young well informed on this subject, I also believe that he is wrong when he says we should dismiss it, although I cannot add anything worthy of discussion. In the instance mentioned by Dr. Crossland of the distinction between occlusion and articulation, there is a vast difference between the two terms, as he said in his remarks, and the distinction made by him is correct and in accord with Dr. Wilson's paper on this subject. Another instance of the incorrect use of words is shown by the distinction between pliers and tweezers. This is a very ordinary thing, but it is incorrect to say that you take up gold with tweezers when you are using pliers. This seems of little importance, but it is best that we should have our nomenclature just right.

Regarding English literature, I do not think that we can ever become proficient in English literature without a knowledge of Latin, Greek, and German, because it is mostly derived from those languages. If we desire to be English scholars, we must first be well versed in Latin, Greek, and German. Languages should be simple, like all great ideas; although it has been forty-odd years since I studied Arnold's Latin grammar, I remember some words very well, and I know they have helped me all my life, although I fail sometimes to express myself correctly.

I want to commend this paper. I know the author intimately; he is enthusiastic on the subject and has done a great deal along this line, and I congratulate him most heartily on the manner in which he has presented the subject to this association. Dr. Gray, who has had the task of reading two papers today, is to be congratulated on having read them so well.

Dr. Corley. I move that the subject be passed, with an expression of thanks to the author, Dr. Guilford.

The motion was carried.

The next order of business as announced by the president was a paper by Dr. W. C. King, Nashville, Tenn., on "Dental Education," which was read by Dr. Gray, as follows:

Dental Education.

By WM. C. KING.

At nearly all dental and medical meetings of late years the subject of education has been discussed, and past methods have been recalled and criticized. These talks were often interesting—as, of course, every individual has his own ideas as to what education means—but almost as often these discussions were tiresome. Professional men and cultured business men widely differ in their views. The general public believes that the man and the woman who have the ability to do their work easily, skilfully, and satisfactorily, are educated in their calling. The public cares little, as a rule, whether or not they are highly educated in the true sense of the word. What the public expects from our profession is a man

that can do his work with ability and at a fair price for the service rendered. A cultured dentist will naturally draw and keep a refined *clientèle* by reason of his social position. Education will therefore be the means of eliminating advertising quacks.

Education is the art of developing human beings for the functions for which they are destined. In order to perfect an art, it must be founded on a corresponding science; and of nothing is this more true than of education. The knowledge of man's nature is usually comprehended under three divisions: (1) The constitution of his body—physiology. (2) The constitution of his mind—psychology. (3) His moral and religious nature—ethics and religion. If these branches of knowledge were thoroughly investigated they would furnish the solution of the two main questions on which all education hinges:

(1) What are the dispositions and acquirements which it is most desirable to implant and foster? In other words, What is the end or aim that the educator ought to pursue?

(2) What are the best means to attain that end?

The sciences named above are themselves in a too imperfect and unsettled state to furnish the basis of any theoretical plan that would be universally accepted; for our knowledge of human living beings, and still more of moral beings, must, as is now well understood, be the last which will reach the stage of scientific certainty. It is therefore useless to look, as yet, for any complete theory or philosophy of education.

I do not know of any profession that has grown and developed as rapidly as dental surgery in regard to education. We started with nothing—absolutely nothing! Any barber, blacksmith, or mechanic could practice dentistry. All that was required was strength of arm and a pair of pliers or nail-pullers. It was not considered necessary that a man should be scientifically educated. This idea has not yet been entirely removed from the public mind.

Our standard has been raised until now the laws of the Association of Dental Faculties require that the applicant must have a diploma from a reputable institution, a certificate of entrance to the third year of a high school, a first-grade teacher's certificate, or its "equivalent." If this law were rigidly enforced and the word "equivalent" were left out, or interpreted so that it could not serve as a loop-hole, the conditions of admission would be strict enough. The great trouble is that our county superintendent's office is a political one; our state dental boards, or examiners, are political offices filled by men some of whom have no education whatever, and could not themselves answer the questions they ask. There is not one school in the country that has not admitted men who were known to be not up to the standard, but what could the school do—the applicant had the "equivalent." No one, however, can deny that if the letter of the law did not have that word "equivalent," many men would be shut out who can and do make excellent dentists.

There are some schools that should not be in existence, for the reason that they are not holding up the standard, except in their catalogs. In reality their equipment and faculty are so unsatisfactory that they are unable to hold their students after the freshman year. Their being incorporated in the Association of Dental Faculties, however, places them

on an equal footing with the best schools in the country, and students can enter any other school desired after securing credentials for one year's work. There are other schools in the association that have no regard for ethics or education—all they want is the student, or the $150. They matriculate a student regardless of his literary qualifications, with the promise of "seeing him through" a preliminary examination. I am glad to say that this class of schools is in the minority. You all can remember what a commotion was raised when the course was extended to four years. Why? Because some of the schools were afraid lest they would lose a few dollars. The majority are doing everything in their power to uphold the standard and to graduate skilful, educated dentists.

I am of the opinion that, with the present curriculum of our schools, the student does not have enough practical work. Too much time is devoted to things that do not concern him as a practical dentist. How many of us have seen men graduate that have had only seven months of practical work! The state boards require that some practical work be done before they give a certificate. This will necessitate the student's receiving more practical knowledge than he is now given, to pass the state boards.

As far as theory is concerned, most of our schools are doing good work. There are, however, a few branches, in my estimation, that are badly neglected: pathology, bacteriology, and histology. These branches could well receive more attention, especially pathology. A good many of our schools do not pretend to teach them, except as a sort of side issue. They have no laboratory in which to do any work in these branches, the importance of which cannot be questioned.

It is a difficult matter to cover all the subjects that should be taught in a dental education, during the present course of three years. I believe that every student should spend at least two years in the operative department. As it is now in most of the schools, the student does not enter into this department until his senior year. In some cases he gets into the operatory in the second half of his junior year, but these are rare cases. If all the men that enter our dental schools could have gone through the manual training schools, as we have them now, they would make far better students and would be better fitted to grasp the dental subjects. I have always contended, and always will believe, that the student should be allowed in the operative department during the last part of his first year. Make him an assistant to the senior class. Give him simple operations, such as cleaning, treating, etc. It would not be necessary to drop any of the scientific part of the course, but some of the unnecessary laboratory technique with which some of our schools are overburdened could be cut out. By this means you would stimulate, encourage, and benefit the student by giving him something that will assist him in his training and make a better dentist of him. As it is now, most of our students have to learn the practical part of their profession after they graduate. This means a loss of valuable time, and the graduate feels that he should have received this information while in school. He realizes this more forcibly when, after obtaining his diploma, and after having gained the impression that he knows all there is to be learned about dentistry, he is yet unable to pass the state board.

A man may stand by a chair and watch others perform operations until he is

gray-headed, and yet he will never acquire the ability to do the work himself. He may fill cavities in tooth-brush handles, etc., for centuries, and yet, when called on to manipulate a similar cavity in a person's mouth he will find himself a very, very poor operator, if not a complete failure.

Discussion.

Dr. R. C. Young, Anniston, Ala. The question of dental education has always struck me as being constructed upon the wrong foundation. Now, to begin with, I am candid in saying that I think we have entered the fold by the wrong door. If I could have my way in this subject, I should make every dentist an M.D. before he was allowed to touch a dental instrument. I believe that dentists are born, not made. I believe that the scientific man is made, not born. I believe, furthermore, that every dentist who ever arrives at the stage of prominence as an operator has gained that through Almighty God, who has given him the ability. In other words, you cannot make an operator, but you can make a scientific man. I do not stand here to criticize the colleges for not doing this or that. Gentlemen, dentistry would not stand where it stands today if it had not been for the dental colleges, but the trouble is that we started wrong, that we went in by the wrong door. Now, why do I take this stand? Some years ago I visited a neighboring town and went to a large entertainment, and by a prominent gentleman I was introduced as Dr. Young to a dear old lady of the town. She asked me if I was going to locate there, saying that they were in need of physicians. The gentleman who introduced me said, "Why, he is not a physician, he is a dentist." He would not have said that about a rhinologist or an oculist, because they are M.D.'s before they become specialists. I believe that after the student has received the proper training in medicine he can be taught dentistry in one term of seven months, provided he has the natural mechanical ability necessary for a dentist. One good thing the colleges have to contend with in preparing men is the examining boards. It is a disgrace for any dental school to have a student turned down by these examiners. They are compelled to prepare these men so that they will pass the dental board.

Each individual holds his future career in his own hands, and it does not make any difference what you teach, it rests with that man whether he will be successful or not. There are a great many men going into dentistry because they think it is easy, and because they think men make money out of it. Many men take up dentistry without any education at all, because they think it is easy to enter into the profession, and many, who would only make second-class plow hands, are admitted without any education at all. The fact is lost sight of that the school only prepares a man for study.

I believe, however, that dentistry is progressing. We are paying more attention to the study of the secretions of the mouth, to the analysis of the secretions of the kidney, etc. All this tends in one direction, and I believe that in the next ten years the dental graduate will have to be a full-fledged M.D. before he gets his D.D.S. degree. Then, gentlemen, our position in the eyes of the public will be the correct one. If a man has a fracture or a lesion of the mouth, he sends for a physician. He never thinks of the dentist. The physician comes and

turns him over to the dentist, because he does not care to take the responsibility. But if a child sticks a fish-bone in his throat, the rhinologist or throat specialist is immediately sent for.

Now, gentlemen, it lies with us! The schools cannot make dental operators. They are born, and it is not the school, it is the man behind the instrument who makes the dentist. I hope to live long enough to see every man an M.D. before he is allowed to practice dentistry.

Dr. Wm. Crenshaw, Atlanta, Ga. I hope Dr. Young will live a long time, but he will not live long enough to see that. I do not agree that it is necessary for a man to be an M.D. in order to practice dentistry. I cannot see where the value of a medical training lies in a dentist's education, except in so far as the two professions study the same sciences with the purpose of perfecting themselves. We get all we need of physiology, anatomy, and chemistry, and more than the average dentist has any need for after he graduates. This being the case, what is the sense of spending two or three years to get a medical diploma before a man enters upon the practice of dentistry.

Dentistry is not a specialty of medicine, and it cannot be properly called so. I therefore do not agree with those members of our profession who consider dentistry a specialty of medicine. Why is it claimed that it is a specialty of medicine? One man will say, because we teach anatomy in connection with dentistry, or because we teach chemistry as a part of the dentist's education. I would answer that medicine is not made up of chemistry. Chemistry is a science by itself, separate and apart from the practice of medicine. Physiology also does not come from medicine, but medicine gets a great deal from physiology. Physiology is a science by itself. Medicine gets more from anatomy than anatomy does from medicine, because anatomy is a science by itself. Medicine is made up of such studies as are proper to assist in its formation and its education, and the same holds true with dentistry. The time is here now, and ten years more will emphasize my opinion, that we do not need the education of the medical man to fit us for the practice of dentistry any more than the medical man needs the training in dentistry to make him an M.D. I have thought over this question for ten or twenty years, and have heard it discussed over and over again, and am now farther from understanding the view which Dr. Young takes than I was twenty years ago. I do not believe we will ever see it. I do not believe we need to see it.

Dr. Young. I should like to ask what your definition is of a medical man.

Dr. Crenshaw. Although I have answered this, I would say that it is a professional training made up of the sciences of anatomy, physiology, chemistry, bacteriology, histology, pathology, surgery in general and special, and the composite subject called the practice of medicine. The medical student studies anatomy, physiology, chemistry, histology, bacteriology, etc., and dissecting of the body, and in this way gets the training and information which make the medical man, the same as the dentist must take up some of these subjects in order to become a dentist; when he has done this, he has appropriated from these sciences enough for the preparation of the dentist. In the same way the medical student appropriates from these clearly defined sciences that which is necessary for the preparation in medicine.

Dr. Young. Gentlemen, I love Dr. Crenshaw like a father and I do not like

to disagree with him, but the point I want to emphasize is this: He says that chemistry, physiology, and anatomy are independent sciences, but the trouble is that the dentist needs them all, and the more of these sciences you give him the better he will be fitted to treat the diseases of the oral cavity, which are just as important as the diseases of the stomach, kidney, or any other region. Now Dr. Crenshaw says that this has nothing to do with dentistry; if that is the case, I should like to shut up my office and live in the woods for the rest of my life.

Dr. J. P. Gray, Nashville, Tenn. I think that the essayist's paper from a general standpoint contradicts itself, just as Dr. Crenshaw does. I am surprised to hear a man of Dr. Crenshaw's standing get up and preach as he has done today. The trouble with the dental profession of today is, that they are nothing but a lot of mechanics, and we cannot get around that. Our methods tend to develop mechanics and do so. The methods of instruction in our colleges are tending to mechanics. We get a smattering of all sciences, but not a thorough training in any of them. Dr. Crenshaw says that we do not need it. If we do not deal with diseased conditions, we do not do anything. If a man can learn the physiology of the mouth and the anatomy of the mouth and study the pathology of the body, he is better fitted to practice dentistry, because dentistry requires scientific training. The time has gone when men simply stuffed teeth. The people are becoming educated and are beginning to understand that a man must have a good education if he wishes to practice our profession. The trouble is that the colleges are not doing their duty because they do not go far enough. The time has come when we cannot teach in the schools simply mechanical work, but we have to teach the science of it. A student must have anatomy and physiology if he hopes to study pathology, and if you eliminate that, you eliminate all but the mechanics. I would far rather have a student go out of college after two or three years of scientific work in the fundamental branches and one year of mechanics, than have him go out with nothing but mechanical training. In the latter case he goes out simply as a mechanic, and he will grow more into mechanics all his years, because the profession naturally tends to mechanics, and when he becomes a busy man he will not study the science of medicine. You cannot eliminate dentistry from the medical profession any more than you can eliminate ophthalmology, rhinology, stomatology, or anything else. We must keep in line because we have more diseases to treat than the rhinologist, and it is a shame, a disgrace, and a parody that when a dentist wants to give a patient a dose of medicine, he must direct him to someone else to do it. When you do that you magnify the physician and degrade yourself, and that is exactly what we are doing. If we have a patient with an aching tooth that is out of the ordinary, without the perceptibility of caries at the aching point, there is never any doubt as to the condition of that patient's alimentary tract, which a dose of calomel would correct in a great many cases; but the patient is sent to the physician. This magnifies the latter and degrades us.

I do not fully agree with Dr. Young. Up to a certain point the dental student should have the same form of instruction as the medical man, especially in all the fundamental, the underlying branches.

His instruction in pathology, histology, and bacteriology should be the same, but I do not believe that it is necessary to give him the same instruction in many of the branches of medicine. A knowledge of some of the branches of medicine and surgery would be, however, of inestimable value for the dental student. It makes him a better prepared man, and when he goes out he will be a scientific man instead of a mechanic. I am not decrying mechanics; we must have that, but we cannot separate our profession from the medical profession; it is a specialty of the medical profession, but Dr. Young will hardly live long enough to see the M.D. required of every man before he takes up dentistry. A few of us are hammering away on the question until we get scientific instruction in our schools, and we shall no doubt succeed.

Dr. J. H. Crossland, Montgomery, Ala. If I should go back home without hearing another speech at this meeting, the one we have just listened to would amply repay me for coming here. It has done my soul good to hear what has been said. It was my intention to make a desperate effort to say something along this line, but I am glad that Dr. Gray has spoken first, because he has said it so much better than I could. There is a certain seal which nature sets on the brow of man, and that seal shows whether nature intended a man for "the man with the hoe," or for some higher calling, and every man can read that seal; and every man and woman in every college reads it when an applicant comes for admission. Some seem to heed it and some do not. Just how we are to induce our colleges to heed that seal I know not, but as long as we disregard it we will have the same conditions as we have now—many plodding along as mechanics at the tail end of the medical profession. Nothing is plainer than the fact that dentistry, if it is not a specialty of medicine, *should be* one. Dentistry as practiced by the average practitioner of dentistry is doubtless not a specialty, but dentistry as practiced by the best men is a specialty of medicine, and it is entitled to that distinction. I love my profession and am proud to call it a profession, and I trust that the older I grow the more I may see it grow into a scientific profession. It matters not how great a degree of mechanical skill we have, unless we have the underlying sciences which Dr. Gray indicated we cannot progress as we should.

Dr. G. A. Carr, Durham, N. C. I wish to commend what has been said by several speakers. I have not practiced dentistry very long, but the longer I practice the more I feel the need of a more efficient knowledge of medicine. While in college I gave a great deal of time and attention to the study of medicine, and do now, and the only regret I have in connection with my dental education is that I have not the M.D. degree. I have no desire to practice medicine as a profession, but when a patient comes to me and wants a general anesthetic administered, I dislike to feel that I have to send for an M.D. to administer it. That is the way we all feel—we like to have another man take the responsibility. I administered chloroform and ether several times, but gave it up, not because I did not feel competent, but because I felt that I was jeoparding my reputation every time I did it. If I had an accident, the people would not stand up for me, and I feel as if I want the medical man to take the responsibility.

Dr. R. B. Adair, Atlanta, Ga. I have some decided views on the subject of den-

tal education. I graduated at the old Baltimore College 'way back in the days of Bond and Austin, when we did not get much anatomy, physiology, or pathology in any of the dental schools, and I had not practiced dentistry long before I felt the great need and necessity for a better preparation in these branches. I felt this need so urgently that I had to go to work and prepare myself, and when my son entered the profession I was determined that he should not be hampered as I had been, and therefore had him educated in medicine first and then in dentistry, and I feel that I have done my duty in doing so.

I have the pleasure of having among my special friends a man who is teaching anatomy in both a medical and a dental school. I have had frequent conversations with him on the subject, and he has told me that it was next to impossible to teach anatomy to a dental student. I asked him why, and he said because they knew that they did not have to learn it. I asked him if he could teach anatomy to the dental student in a medical school, and he affirmed it, because the dental student knows that he *has* to learn it. Now, then, if we want to lay a broad foundation insuring success for our students and for their profession, I believe that the proper way of educating a man in dentistry is to educate him first in medicine, or to make the curriculum of the dental schools equal to that of the medical schools. It is very humiliating to me to be brought into frequent contact with medical men for consultation in operations, thereby acknowledging their better qualification, and I hope the time will come when the standard of dentistry will be raised, and we shall be recognized by the public and appreciated fully as much as the rhinologist or the oculist or any other specialist.

Dr. G. V. I. Brown, Milwaukee, Wis. The subject under discussion has been covered so fully and so eloquently that there is nothing left to say, especially in the absence of the author. As far as the composition of the paper is concerned, I know of no better or more thorough paper, particularly along the line of pathology and histology, that has been recently presented to the profession. I wonder if those who teach these branches were ever asked by students where they could find a book in which to study these subjects. I am sure they have been asked questions, and I am wondering what their answers were. The trouble is that we have no literature on the subject of oral pathology that is fit for the thorough, scientific pursuit of the study.

In the discussion of the practical feature, the science reduced to practical facts, there is some question as to the two sides of this problem. First of all we should revise our literature. Next we should bring scientific investigation to such a point that there will be no question of division, no point of difference such as has been raised by Dr. Crenshaw. While I do not agree with him, I realize the force of what he said; nevertheless I think the time will come when Dr. Crenshaw will be glad to be admitted to the medical fold. As far as the question of dentistry being a specialty of medicine is concerned, it seems to me that it is very easily settled. If one who assumes that it is not would only draw a definite dividing line indicating the demarkation—in other words, would tell us what the dentist can do without in any way impinging upon the healing art; and then, if all dentists would agree to keep on this side of that line and not cross

over, dentistry would be a profession altogether by itself. But to my mind this is impossible. I have with me, among my pictures, some photomicrographs taken of an individual who appeared to have merely a disease of the gum, yet slides taken of the heart, lungs, liver, spleen, kidneys, and other vital organs of the body showed the same round-cell infiltration, the same inflammatory condition as in the mouth. This was in outward appearance only a disease of the gum, and I presume that every dentist considers it his right to treat the gums. I have had other similar cases, but these are perhaps exaggerated instances, though we never know when pathologic conditions of the oral cavity may be accompanied by diseased conditions of the other organs, and for treating those diseases it is not sufficient that we be only dentists.

On the other hand, in broadening our science we should be very careful lest we lay out more than is possible to reasonably accomplish in a lifetime. In recently discussing this matter with a university president in relation to a course for my son, we agreed that he should take a course occupying ten or twelve years before he could get through with his studies. I asked for what my son would be fit, after he had received all his education, being all this time provided for so that until he had attained a necessarily advanced age he would have no responsibility of earning money for himself. The answer was that he would probably only be fit to enter some less educated but practical man's laboratory on salary—be employed by a man who was about to build a practice. I understand that this is not a scientific argument, but it is a very practical one. I grant that we need all the sciences, but you must grant me that the practical side of this problem must be worked out in a useful form.

Dr. Crenshaw. I think Dr. Gray characterized what I said as nonsense. I have already said that we must have chemistry, anatomy, etc., but of these sciences we get all we can use and more in a dental course. Every reputable dental school is giving to the dental students all the chemistry, anatomy, etc., that they need, but I consider it is a waste of time to carry these studies to the extent that the medical student needs. The student of medicine is instructed in these branches, and so is the dental. I therefore fail to see where the nonsense comes in, unless it be rather on Dr. Gray's side, who admits that our schools —his own I presume he means—cannot teach the subjects above referred to. I do not wish to be misunderstood as claiming that our profession is bigger than the medical. My contention is that we occupy a different sphere and have a different life-work to perform; but there is a sort of boot-licking to the medical profession going on in the dental profession—a cringing to the medical men for recognition—that I do not like. I believe we are distinctly a profession of ourselves, and that we have a big enough task to perform; if we undertake to fill a position that is not ours and attempt to do the work of the medical profession we are injuring ourselves and not aiding them. It should be clearly understood that the profession of dentistry is distinctly a profession by itself, as it ought to be and always will be, and when it fails to be it fails to perform its own particular mission.

Dr. Gray. I wish to answer Dr. Crenshaw with reference to what he says is being taught in every thoroughly scien-

tific school, that is, that they are giving all the instruction they can in these branches. My point is that we have not the time to give instruction of such a character as is desirable. I care not whether it be a physician or a dentist—and by physician I mean the general practitioner of medicine—we must be able to teach these branches scientifically in order that we may impart to the student that knowledge which he should have. I agree with Dr. Brown in some particulars. If you attend the meetings generally and watch the trend of thought and the discussions, you will find that we as a profession are not able to discuss scientific questions that pertain to our own branch in such a manner as we should. If you go to a meeting of medical men, you will find them discussing almost every question that comes up. If a fairly scientific paper on some subject is read before a dental meeting, the majority of the men will not be able to discuss it; this is not so in other associations. At every dental meeting you will find, for instance, that only a portion of a paper on pyorrhea appeals to the average dentist, namely, that which deals with the mechanics of the subject. They do not study the science of pyorrhea and try to find out the etiology and pathology of that disease. Yet we must have a scientific understanding of the subject, and I believe that it is time for us to begin to study medicine. I do not care in the least for the recognition of the medical profession; what I want is my part of the medical science, because it is a part of dentistry, and I want to stand on an equal plane with every branch of medicine.

The next order of business was the reading of a paper by Dr. I. N. Carr, Durham, N. C., entitled "Dental Prophylaxis and Oral Hygiene."

The paper here follows:

Dental Prophylaxis and Oral Hygiene.

By I. N. CARR.

The attitude that the individual dentist takes toward his patients and the general public regarding this all-important but sadly neglected subject cannot be too strongly brought to our attention. While the medical profession is making wonderful strides in the direction of preventive medicine, the dental profession has paid altogether too little attention to the subject of preventive dentistry. To the lamented W. D. Miller much credit is due for his exhaustive studies and experiments in the field of bacteriology, which have revealed to us the cause of caries of the teeth. He was to the dental profession what Koch has been to the medical. He proved the bacterial origin of disease and decay of the human teeth and left to us a priceless heritage, for, in giving us the *casus belli,* he left it for us to discover the weapons for the fight. We are told on high authority that "Cleanliness is next to godliness," and nowhere in the human economy is this saying truer than when applied to the human mouth. We will, therefore, start out with the proposition that in a perfectly clean mouth decay cannot take place. If bacteria are necessary for developing and continuing the process of decay it follows

as a logical deduction from this premise that the destruction of bacteria and of their by-products will prevent decay. This, however, would be searching for a remedy that would destroy an existing cause of disease, but what we, as honest and conscientious dentists, should desire most to accomplish is to inhibit the cause itself by placing the oral cavity in such a healthy condition that bacteria cannot find lodgment there.

Let us, then, start out from the following indisputable proposition: Neither parasites nor animals can live or propagate without food. The most logical conclusion, therefore, is to devise some means, at once practical and efficacious, which will prevent the migration and lodgment of bacteria in the oral cavity. This is, however, more easily said than done. Yet all reforms are brought about by gradual development. I do not claim to be endowed with prophetic vision, but I see the time coming when the civilized peoples of the earth will have perfect dentures, dentures that will be as free from decay in the living, breathing, pulsating man as they are in the lifeless skull of the corpse. Worms may devour this body of ours after we have been laid away in the tomb, but the teeth remain for centuries afterward without the slightest sign of decay. Why is this so? Simply because the very dirt of the earth is too clean for bacteria to thrive in. The bones decay by chemical processes going on in the grave, but the teeth *never*. What a commentary on the condition of the mouth! With all our scientific attainments, we have not been able thus far to keep our mouths as clean as the clay to which Mother Earth gathers her children. We are living in an age of preventive medicine; let us, then, in dead earnest, begin the age of preventive dentistry! If every man in this association would devote as much time and thought to the subject of preventive dentistry for the next twelve months, as during the past twelve months he has given to cast gold inlay work alone, we would surely make great strides forward in this most important of all the subjects of our profession. I should be glad and happy to see the day dawn when, in accordance with the great law of evolution, dentistry will have reached its highest development; when it will have learned how to destroy the very source upon which it now thrives. This having once been accomplished, the most natural question would be: "What is the ultimate destiny of the dental profession?" My answer is: "Its own obliteration." All that is in a state of evolution—and that includes everything—is bound to disappear. A great philosopher has said: "Nothing is constant and abiding but *change*."

Visionary though my prediction may seem to you, the time is coming when science will discover the specific germs or micro-organisms that produce caries of the teeth, and when these are found a serum will be produced which when inoculated into human beings will render them immune to this disease just as effectually as the inoculation with vaccine virus will render man immune to smallpox. Had the great Miller lived long enough his investigations would, I believe, have been pursued along this line. Yet we are not without hope, for we have at least one man among us who is capable of taking up the work where the lamented Miller left off. To that man as much as to any man living the dental profession owes a debt of gratitude for the work that he has accomplished. I refer to the accomplished and scholarly, and withal modest man, Prof.

E. C. Kirk of Philadelphia, Pa. I believe that I know well this eminent professional *confrère,* having followed his teachings closely for twenty-five years, and I therefore say to this convention, without any apology, that in my opinion he is the man of all men to take up this work, and I sincerely trust that his great love for his profession will induce him to do so.

My conviction as to the eventual discovery of the specific germs or microorganisms producing decay of the human teeth, and of a serum preventing it, has been enhanced by an article which I recently read concerning a serum produced from the venom of the deadly lance-head viper, which has been found almost invaluable in the treatment of extreme cases of insanity, and also of many malignant diseases, such as typhoid and scarlet fever and diphtheria. You are all doubtless familiar with the manner in which the extracting of venom from this deadly viper was accomplished. How the viper was captured about the headwaters of the Amazon in Brazil after years of painstaking efforts in the course of which many obstacles that appeared almost insurmountable were finally overcome, and was finally brought to New York about a month ago; how the venom was extracted by Dr. Raymond L. Dietmars, curator of reptiles at the Bronx Zoological Park; how he held the reptile's neck firmly upon a table and gave the signal for one of his assistants to place the glass receptacle into the snake's mouth at the moment when the venom spurted harmlessly into the glass, etc. Now, if we consider what the scientists tell us, that one-ten-trillionth grain of this poison is the maximum dose, and that the one-third of a teaspoonful extracted will produce serum enough to supply the world for fifty years, and that it will cure insanity, it does not require so great a stretch of our imagination to believe that a serum will be produced at some future time that will render our teeth immune to decay.

In the meantime, we who have the welfare of our patients at heart should do all within our power in the domain of prophylaxis and hygiene to prevent decay of the teeth as much as possible. We should be like teachers, whose duty it is to so fit their pupils with knowledge that they will finally be able to become independent of their teaching. The dentist occupies a similar position toward his patients, and it should be his most important duty to so well instruct them in the laws of hygiene and prophylaxis that after a while they will not need a dentist. This grand era will of course not arrive during the lifetime of the present generation, nor of many generations to come, but as surely as men live to think, the time will come when everybody will be so well informed in the laws of hygiene and in the general care of the entire body that, just as Jenner robbed smallpox of its victims, and as the National Board of Health has conquered yellow fever, our profession will find a way of wresting the teeth from the destructive power of bacteria.

Let all rally to the support of Alabama's earnest worker in this field of dentistry, Dr. J. P. Corley of Greensboro, and assist him in his work outlined in his splendid report on behalf of the Committee on Oral Hygiene and read before our national body at its meeting held in Atlanta two years ago.

Not to weary you, I shall, with your kind permission, close this paper with a few practical suggestions:

(1) Let us endeavor to gain access

to the hospitals, and instruct the nurses in the care of the teeth of patients in their charge. Show them the necessity of keeping the mouth and teeth clean, and teach them how to accomplish this with a sick patient. Give them a practical demonstration of how to brush the teeth, and above all else, how to rinse the mouth after giving food. By rinsing I do not mean that a mouthful of water should be taken into the mouth and almost immediately ejected, but the tongue and cheeks should be used to suck the water forcibly and strenuously between the teeth in order that all particles of food might be washed out; then a toothpick—a fresh one every time—should be taken and the teeth cleaned. Teach them the necessity of scraping and brushing the tongue and the gums.

(2) See the superintendent of your public schools, and ask him for permission to give a short lecture once or twice a month on the proper care of the teeth. Make these lectures short and comprehensive to the pupils from the first to the tenth grades, and finally, in your office, show your patient by an actual demonstration in your own mouth how to brush the teeth, and above all how to thoroughly rinse the mouth. You frequently hear mothers say that they cannot get their children to brush their teeth regularly, if at all. I have found two ways of overcoming this antipathy of children against the tooth-brush. One way is to appeal to the pride of the child, and the other is to make a strong suggestion to his subjective mind while the objective mind is in a passive or quiescent state. This I find a very valuable aid in my work. I never forget the scientific fact laid down by eminent psychologists that the subjective mind of a person is constantly amenable to control by the power of suggestion. In simpler language I would say: Get the full confidence of the child, and you can accomplish anything you wish. I could enlarge upon this subject, but have already consumed too much of your time. Let me close with the admonition: "Do your duty."

The discussion of Dr. Carr's paper was deferred until after the reading of the report of the Committee on Oral Hygiene.

The next order of business was the report of the Committee on Oral Hygiene, by the chairman, Dr. J. P. Corley, Greensboro, Ala., as follows:

Report of Committee on Oral Hygiene.

By J. P. CORLEY.

Mr. President and members of the Southern Branch of the National Dental Association,—We have gone daft on technique! Our college curriculum makes us dental surgeons. Our leading teachers are craftsmen!

The technician who cuts with most audacity, packs foil with greatest dexterity, makes the best ceramic restorations and gold inlays, is accorded the homage due to an uncrowned king.

Nine-tenths of our college training fits us for the arrest of diseases and for the restoration of lost function. Nine-tenths of the college examination purports to determine our manual and surgical dex-

terity. Nine-tenths of the state board examination has the same purpose.

Much of the reading matter of the dental journals is a discussion of new and ingenious methods of restoring lost contour, of priority wrangles, etc.

The dental association has grown to be little more than a postgraduate laboratory.

The average dentist knows little of prophylaxis, cares less, and tells his patients nothing. The average dental college teacher knows little of prophylaxis, cares less, and tells his students nothing. The average association *habitué* knows little of prophylaxis, cares less, and tells his fellows nothing.

If you want a bird's-eye view of the trade called dentistry, go to the supply house, where half the invoice is artificial teeth. Go to the dental laboratory, where twenty workmen are employed in making plates, gold crowns, bridge work *ad infinitum*. Go to the operating room of the average dentist and hear the buzz of his engine, the tap of his mallet, the snap of his forceps. Go to his laboratory and note the odor of his vulcanizer, the roar of his blowpipe, the whir of his lathe. Slip back to his operating room and see him put a gold crown on an anterior tooth, or a dozen gold fillings in the front teeth and leave a dozen gaping cavities in the back teeth. Watch him extract a first molar for a girl or a deciduous tooth five years before its successor is due.

Notice the benign smile with which he patronizes his patient, as she speaks of the marvelous strides of dentistry while he scrapes off mass after mass of soft gingival secretions and leaves a dozen pits, a dozen faulty fissures, a dozen overhanging fillings, a dozen patches of subgingival calcific deposits. Then listen to his parting benediction as he pockets his fee and bows his patient out with the advice: "Come again in a few months and have me clean your teeth."

Go to the association, scan the program and note the preponderance of subject-matter which deals with the cure rather than the prevention of disease. Discover that the essays which elicit the most learned and enthusiastic discussion and hold the rapt attention of the house for an entire session are those which treat of some rare condition met with perhaps once in a lifetime, and which requires an elaborate surgical procedure.

Go to the clinic and see what is being done in modern dentistry. Watch the G. V. Black Club man pounce upon an upper second bicuspid with a pinhead cavity in the mesial surface, between the approximal contact point and the gingival line. See him adjust the rubber dam, wade into the disto-occlusal sulcus and cut a boulevard through to the mesial surface, thence down to the pericemental line. Then watch him chisel away the anterior third of the tooth. Also watch the quivering patient as the tears trickle down her cheeks, and the perspiration stands out on her brow!

The spectators with open mouths and wide eyes will not give you a chance to see many of the details of the operation, but you may later hear from some spell-bound admirer the record of the filling. It will read something like this: Preparation of cavity, thirty-seven minutes, fifty-two seconds; filling cavity (five and one-half sheets of gold), seventeen minutes, eight seconds; finishing filling, one hour and twenty minutes; total time of operation, two hours and fifteen minutes.

But let us pass on down the line. The next chair is the same and the next and next for seventeen chairs. We then come

to the porcelain exhibit, which is all very fine, but, like the international exposition, when once seen it is seen forever, with the possible variation that an occasional ceramic artizan will cut his tooth with a little more abandon and perchance come a few numbers nearer to his shade.

We are much interested in the orthodontic display, since the first step in obtaining and maintaining immunity from oral disease, both dental and gingival, is a perfectly aligned and perfectly occluded set of teeth. But even here we are often horrified by regulating appliances which render even a moderate degree of sanitation impossible. This may in rare cases be justifiable, but we should ever keep in mind the desirability of *sanitary* appliances. True, we find here and there some mad fanatic who undertakes to introduce a sanitary crown, bridge, or regulating appliance, but his clinic receives scant attention.

We often hear from admiring patients and self-admiring dentists of the prodigious strides of dentistry; and while the ideal which has been realized in dental science should make it a profession, yet when we consider the status of dentistry as it is practiced through the length and breadth of the broad earth, we are compelled to confess that it is little more than a trade. We are called doctors only by the grace of God and the stupid credulity of an indulgent public. You might as well confer this title on the jeweler or the blacksmith as on the average dentist.

But why this scathing tirade against the association, the college, and the individual dentist?

We are not parading our dirty linen for the pleasure of the display, but for the purpose and in the hope that we may better show the cause and suggest the remedy.

Why are we mechanics when we could and should be scientific prophylacticians? First we must consider our paternity: We were born and bred in the barber and the silversmith shop, have come up through the various stages of evolution, until we are now or should be a scientific profession. Whether or not it takes a hundred years to make a gentleman, it certainly takes time to make an artist of an artizan.

Then comes the sordid but insuperable difficulty of compensation. It takes time to teach the people the wisdom of paying for immunity rather than for patchwork. Thus the work of the hygienist is largely a labor of love. A majority of the men who elect the vocation of dentistry do so for the sake of the financial emoluments. To expect the college to develop in these men the artistic and professional sense to such a degree that they are willing to spend much of their time and their best effort in gratuitously teaching the people prophylaxis, while their neighbors are selling their time for gold, is absurd.

The association is composed of the more public and professional spirited members of the profession, and it is up to them to institute and maintain a systematic campaign in the interest of oral hygiene, and it is for this purpose and to this end that I am presenting this paper.

A plan as gigantic and arduous as the evangelization of the general public can be accomplished only through associated effort. Such a work requires a system which will be at once centralized and elastic, allowing the freest initiative to its various members, yet being under the control and auspices of the ethical associations.

The Committee on Oral Hygiene of the National Dental Association is endeavoring to create in all state associations auxiliary committees to act in mutual co-operation, thus establishing a chain of committees comprising the most enthusiastic and influential students of this most important field of dental science, to work in accord and under one general management for the promotion of the cause.

The ignorance and apathy of the dental public has been a leaden weight, but there is a sunny side to every street. Some of the state associations have created these committees, and the wisdom and enthusiasm of their activities deserves the highest commendation and recognition.

Some of the state examining boards have incorporated a special set of questions on hygiene and prophylaxis, with most encouraging results.

We are beginning to receive inquiries from local societies throughout the East and Northwest as to ways and means of establishing free clinics in the public schools, free lectures on preventive dentistry in schools, before literary and scientific bodies, Chautauqua assemblies, etc.

The dental colleges are teaching this subject more and more, so we are encouraged to prophesy that ere the earth turns to ice and Hades freezes over, a goodly number of the profession may come to deserve the title "Doctor of Dentistry."

Discussion.

Dr. F. A. Johnston, Sheffield, Ala. As chairman of the Committee on Oral Hygiene for the state of Alabama, after a year's experience with the indifference of the profession, I wish to say that before we can hope to educate the public in regard to the importance of oral hygiene we will first have to educate the profession. As chairman of this committee for the state of Alabama, I wrote three hundred letters, mailed them to the dentists of the state, and received less than two dozen replies. In this letter I requested that men who were willing to do anything for the cause of oral hygiene send in the names of educators in their communities or the names of any officers of educational or scientific bodies of any kind. I set forth the plans of the association as clearly as I could, and with the hope that everyone could understand them, but I presume that a great many who did not reply to the letter took it as a piece of presumption on the part of a young man to send out letters suggesting plans for doing this work, and did not pay any attention to the letter. But being a young member of the society and not knowing a great many men, it was not practical for me to make any distinction, and the same letter was sent to every dentist in the state. The object of the letter was to get the names of the educators in the community, and then the committee would write these a letter outlining the plan of work and impressing upon them the importance of oral hygiene, and have them invite the dentists in this community to give lectures before schools or colleges, as the case might be; in that way the lecturer would not be a self-invited lecturer. In other words, he would receive an invitation from the head of the school, and the head of the school was requested by the committee to extend the invitation. As I say, we sent out this letter setting forth the plans and the benefits to be derived from this work, and to my surprise and chagrin I received less than two

dozen replies. A few seemed to misunderstand the letter, and replied that they were in hearty sympathy with the work, but did not send any names. In cases where no names were given we tried in other ways to find out the names of the heads of schools in those localities, and asked that an invitation be extended to the dentists to give lectures on oral hygiene in that community.

I myself did some work in this line, lecturing before some four or five schools, and I wish to say to the dentists that the teachers are glad to have you come, happy to welcome you, when it is shown that you can teach something in this direction; but the profession seems too indifferent to understand what is being done, or else the committee is too stupid in putting the question before them. We received many letters from educators and teachers saying that they would gladly welcome those who could teach on this subject, and so I hope that the profession will not be as indifferent toward whoever is in charge of the work for the coming year as they have been in the year past. I think Dr. Corley is to be commended for the work which he has done in this line, and while he indulges in a considerable tirade, and arraigns the profession, colleges, boards, and all, I think he does nothing more than they deserve. The question of oral hygiene is something more important than most of the profession realize. The question of recognition by the medical profession, I think, depends more on our doing our duty as dentists than on debating whether we should have the degree of M.D. or not.

The question has been brought up as to whether we should resort to the public press for the teaching of the people. While I have received very little encouragement in my year's work, I wish to say that it is through the schools that we have to educate the people. We cannot educate the older people, they are too busy and are not thinking of what we are talking about. If articles are sent to publishers, many of the people will not read them. It is the child that is most susceptible to these suggestions. The most valuable things that I have learned were learned in the public school, and it is so with everyone—it is there where we must begin. Someone writing in the *Journal of the American Medical Association* suggests that the public press be used as a method of educating the people. He says that the ethical men have refrained from the use of the press because it has been used so extensively to advertise quack remedies, but that the press should not be left entirely to the quack, and his argument is logical. Dr. Munger from Iowa says with regard to the public press that we can never educate the public in this way as long as the press is filled with advertisements of the quacks, and contains not a line from ethical practitioners. This is also true of dentistry, therefore the older men in public life should be educated through the public press. Dr. Munger suggests that these articles should be paid for by these papers. Whether this is possible or not I do not know, as I am not sufficiently acquainted with the methods of the newspapers to judge. Many suggestions have been offered in this line, but the most practical way of doing it is through the educators and through the public schools. And if the profession is willing to do its part, if the men are willing to spend an hour or so each week in lecturing before the schools, a great deal can be accomplished. I was in hopes that we could reach

some several thousand pupils in the public schools in this manner, but we failed, because the profession failed to do its part. While I cannot say that every educator will comply with the request that we make, those who have replied to our letters have shown us that the movement will be received heartily by both teacher and pupil. The teachers and the parents are becoming interested, and many have been speaking to me about the benefits to be derived from such instruction, and everyone who has given these lectures has reported an increase of practice. In other words, the children visit the dental office as the result of these lectures in the schools. In the letter sent out, we suggested that the dentist undertake this work without the motive of increasing his practice, but it seems to me that in this way, if in no other, the interest of the profession may be awakened.

Dr. J. T. Meadors, Nashville, Tenn. It affords me great pleasure to have the opportunity of discussing this paper, which was turned over to me for inspection by the essayist, stating that it was my privilege to oppose it or to commend it. As a member of this association, and with ideals which all dentists should have, I stand before you today with the proper appreciation of the subject that is before us for discussion. I remember the instruction which I received when only a first-year student in a dental school, by a wonderful old man who said that in the earlier days, when these things were tolerated, he had placed upon his stationery this device: "Clean teeth will not decay." Being impressed with this fact, I have always been desirous of first cleansing the teeth and placing the mouth in a hygienic condition before I proceeded to do constructive work.

Gentlemen, I think that this subject has been somewhat exaggerated. We are harping on it a little too much. The average dentist gives the mouth hygienic treatment before he proceeds to other operations. I cannot believe that the average dentist does work in the mouth without first placing it in a hygienic condition as far as possible, by cleansing the teeth, by placing the gums in a normal condition, by temporarily stopping cavities which might remain open while he is doing other work. The production of a hygienic condition of the mouth is not always within the power of the operator. It is the patient's duty to co-operate with you, but you cannot always get your patient to do so. There are people who are filthy in regard to the mouth, and what are you going to do with a patient of that sort? You may cleanse his mouth, but within a few hours after he leaves the office, foodstuff is collecting around the teeth and fermentation is going on—unless the patient comes back every twenty-four hours to have the mouth cleansed. There is a limitation to our work, for when a patient is busy he is not enthusiastic over cleansing his teeth and maintaining a hygienic condition of the mouth.

In regard to that heavenly condition which Dr. Carr speaks of, when we will find some serum to eradicate dental caries, I think that we can hardly hope for such a condition. Since man is human and seems to be cursed with filth, bacteria, and disease, we necessarily have these diseases, unless they are prevented by such means as the essayist has pointed out. Dr. Corley maintains that nine-tenths of the college courses, of the state

board examinations, and of the teachers, take up only questions pertaining to constructive work rather than to the treatment of disease. I think that he is mistaken in that, and I am in a position to disprove his statement. He claims that the average teacher, the average association *habitué,* pays little attention to oral hygiene. The average man in the dental profession does pay attention to oral hygiene, and he is a poor excuse for a dentist if he does not. The average dentist does cleanse the mouth before he does constructive work. The essayist claims that laboratory work is the main part of our work, and that many dentists are placing gold crowns on the anterior teeth. I am of the opinion that Dr. Corley has exaggerated these conditions in order to impress our minds with the importance of the hygiene of the oral cavity. Our profession has advanced to such a stage that it takes care of the deciduous teeth. There are very few dentists who extract deciduous teeth without due regard to the consequences, and I doubt whether there is one present who would remove the first molar without a proper scientific knowledge as to whether it should be extracted or not.

I wish to congratulate Dr. Corley on the great work which he has accomplished in this direction, but I do not feel that as a member of the dental profession I should shoulder the criticism which he lays upon us.

Dr. A. J. Cottrell, Knoxville, Tenn. It gives me pleasure to say just a few words on these two papers, particularly the first one. I do love an optimist. We dentists are perhaps the worst lot of pessimists that ever lived. We point out all the bad things and never stop to think what has been done and what we are doing, and, like Dr. Carr, I believe in setting higher ideals. One of our philosophers has said, "Hitch your wagon to a star," and I believe Dr. Carr is doing that. There are possibilities much greater than we suppose, and I for one expect to come as near the ideal as I can, and wish to say that the statement that clean teeth will not decay is not overdrawn. What would have been said of the bacteriologist who ten years ago had made the statement that yellow fever and malaria were conveyed by mosquitoes? He would have been laughed at. Dr. Carr has high ideals, and I commend him for it. I believe that every member of the profession should have high ideals, and try to carry the profession with him. We all know that Dr. Corley has devoted a great amount of time and energy to furthering the work of oral hygiene, and while the picture he presents to us is a little overdrawn, it serves a purpose, and I commend the purpose. But, let us stop and think what has been done! I have been practicing dentistry for twenty years. When I began it consisted mostly of pulling teeth and making plates. Nobody said anything of oral hygiene. These are facts, and those here who have practiced for twenty years know it; the use of the tooth-brush was not general, and who ever suggested floss silk for cleaning the interstices twenty years ago? When I began the practice of dentistry, the swollen and bleeding gums which accompany interstitial gingivitis were supposed to be incurable. Today nine-tenths of the cases of interstitial gingivitis are cured, by men who are common, everyday dentists. We have been progressing, and when we stop to think we may congratulate ourselves on that which has been done. Thinking of the

possibilities in store for us, I advise you, gentlemen, to join Dr. Carr and "hitch your wagon to a star."

Dr. Robin Adair, Atlanta, Ga. As a personal friend and a strict disciple of Dr. D. D. Smith of Philadelphia, and as one who has stood and watched him at the chair, I would feel recreant to my duty did I not say something on this subject. I have been interested in the paper by Dr. Carr, which is simply ideal. It would be ideal if we could find a serum that would avoid the necessity of washing face and hands. It would be ideal, but we have to wash our face and hands in order to keep them clean, and for the mouth we have at our command the system advocated by Dr. Smith, which will prevent decay and almost all pathological conditions that the human mouth is heir to. Any man who has not been in Dr. Smith's office or seen his beautiful work cannot realize what a beautiful set of teeth is. I dare say few dentists in this audience have a set of polished teeth in their mouths; yet these are the men who go into colleges and teach prophylaxis. This is not an overdrawn picture. It is easy enough to clean teeth, but to polish them is another matter. The system of oral hygiene as advocated by Drs. Corley, Smith, and others, is not the mere cleaning of the surfaces of the teeth, but polishing them until they shine with the brilliancy of ivory. If the dentists could see the results of this work, they would be more enthusiastic. I have seen young children without a single spot of decay on the teeth. I have seen superficial decay polished away at the cervical margin, instead of being removed by fillings, so ugly in this position. Every man can polish his teeth—why don't they?

If you will pardon a personal allusion, I wish to tell you how I started this work. Although Dr. Smith had filled me with enthusiasm for it, on going home I soon became discouraged, because I could not get my patients interested. I began polishing teeth for almost nothing, but soon the patients realized the benefits of it, and today, after three years, I have eight patients—all that I can accommodate—who follow this treatment with beautiful results. I now devote one week each month to this work of prophylaxis, treating from twelve to twenty patients on each one of these days. The office maid attends to the matter of engagements, and as the patient is entered for never less than a year's treatment, failure to keep these engagements results in a loss to the patient. It in no way interferes with my regular work of "restoration" for those who are irresponsive to my efforts to save much expense, pain, and trouble.

You can take children eight years of age, polish their teeth and cleanse their mouths, and they will become interested and do their part in brushing the teeth at home. Show them how to brush teeth while holding a hand mirror, and then make them do it after you, and they will become interested. It is a fact that nine-tenths of the lesions which we treat today are due to uncleanliness, and it is a fact that clean teeth do not decay. To cure is the voice of the past; to prevent is the divine whisper of today. Then why, Mr. President, are dentists so lax in this important subject?

Dr. R. C. Young, Anniston, Ala. The essayist speaks of the divine condition of the mouth, of the time when by the injection of an antitoxin we may have the patient immune from decay. There is an antitoxin today which has been used successfully, I believe. I would like

to ask the gentlemen present if they have ever had any experience with potassium sulfocyanid. We are told that in mouths where we have a certain amount of potassium sulfocyanid, the teeth are immune from dental caries. This has gone beyond the stage of experiment. Now, anyone can find out the percentage of sulfocyanid in the saliva by a very simple experiment. Take equal quantities of saliva and distilled water, shaking them thoroughly together, and drop a few drops of iron chlorid into the mixture; if you find the particular test color to be pinkish-red, the patient is immune to decay. If the proper amount of sulfocyanid in the saliva is lacking in a patient, it can be attained by the administration of potassium sulfocyanid in tablets prepared by Parke, Davis & Co.

Another condition spoken of in connection with caries which is often overlooked is the condition of the stomach and of the lower appendages. Inflammatory conditions of the tissues of the mouth cause the excretion of lactic acid, and as soon as we have that condition, decay is going on. A very valuable preparation for preventing that condition is zinc sulfocarbolate, in a four per cent. solution in cinnamon water, which is given as a continual mouth-wash whenever indicated. I allude here to the decay so often found about the necks of the teeth and invariably associated with chronic gingivitis.

Dr. Carr (closing the discussion of his paper). There is very little for me to say in closing except to express my gratitude to the gentlemen here who have so kindly received my paper, and have spoken so appreciatively of it. I knew that it was something radically new, and I was so firm in my conviction of the truth of what I had to say that I had the courage to say it. I am still of the conviction that the time will come when this great desideratum will be reached —this utopian age realized.

One of the gentlemen spoke of prophylaxis and the proper care of the teeth by brushing. I mentioned in my paper the importance of the proper brushing of the teeth and the proper rinsing of the mouth with water of the proper temperature. I said that rinsing the mouth did not mean simply taking a little water into the mouth and immediately ejecting it, but it means that the water should be taken into the mouth and forced by a pumping and sucking motion throughout the mouth and between all the teeth. It is most important to teach the child how to use a tooth-brush, to get rid of his antipathy against the use of the brush; and the best way to do this is to teach him early and get him interested in the care of the teeth. I think if we would all work along the lines of oral hygiene as outlined by Dr. Corley, we should accomplish a great deal, and probably the time would soon come when we should all have to take up another calling!

Dr. J. E. Chace, Ocala, Fla. I have been greatly interested in this subject, and I have a great appreciation of the work which Dr. Corley is doing along these lines. I have served on the committee with Dr. Corley, and I realize the great self-sacrifice which he has made, and the amount of work that it means. The profession does not appreciate the subject as it should; I cannot, however, take the pessimistic view that Dr. Corley takes in his paper, because I realize that progress is being made very rapidly along these lines, and while we may never realize the ideal, still, judging from the progress of the past, I feel sure that

the condition of affairs is fast coming to us when lack of proper attention to prophylaxis will be a serious reflection on the dental practitioner. I remember the meeting of the Southern Branch in Washington, where Dr. Rhein took the position that the man who filled a cavity in a tooth before cleansing the teeth was guilty of malpractice. That may be an extreme view judged by the conditions under which many have to work, but it is a fair one if we assume that the dentist has full control of his patient. I hope that the time will arrive when, as Dr. Carr says, we will have no need for dental prophylaxis, but when we will all have a condition of immunity to dental caries. Still, we must remember that prophylaxis has for its object not merely the prevention of dental caries, but also the prevention of a host of other evils due to mouth-infection. And should a time come when the human family is immune to dental caries, there will even then be great need of oral prophylaxis.

I feel that the last word can never be spoken on the prevention of dental caries until the question of susceptibility and immunity is thoroughly understood; and it seems that we are still a long way from its solution. The loss of that indefatigable scientist Dr. W. D. Miller is indeed a great loss to our profession at this time, when there are so many problems to be solved and so few fitted for their solution.

In conclusion I will say that while Dr. Corley painted the picture in dark colors, I am sure that he does not altogether despair, but rather he tries in this way to spur us on to greater efforts and to urge upon us our great responsibilities.

Dr. H. T. Stewart, Memphis, Tenn. Dr. Cottrell said that Dr. Carr had hitched his wagon to a star and that he should take the profession with him. The only discouraging thought is that we will all be dead before we get to the stars. I would not underestimate anything that Dr. Corley has said and done in the direction of prophylaxis, but at the same time I would not want to overestimate it. I do not believe that the statement that clean teeth do not decay is true. I believe that some clean teeth do decay, and some clean teeth are affected by Riggs' disease. I heartily sympathize with Dr. Corley in his efforts, but there are two ways of looking at this thing, and we cannot expect too much of the profession. There is a practical side to this question. He says we have gone daft over putting in fillings and inlays. Perhaps we have, but the profession will never give the attention to prophylaxis that it gives to fillings and inlays until we have worked it out so that it will be as remunerative to practice prophylaxis as it is to construct gold inlays.

Dr. J. H. Crossland, Montgomery, Ala. The idea that clean teeth will not decay is merely a theory; we do not know whether they will decay or not, because we cannot keep them clean. Teeth that are cleaned now will not be clean in an hour. There is abundant evidence that some apparently clean teeth decay. Old Dr. Freeman used to say that clean teeth do not decay, and that brings to my mind the thought of those days when in his absence we used to recite—

> Tell me not in Freeman's lore
> Clean teeth never will decay;
> To me they are returning evermore
> Though they clean them, so they say,
> Often each and every day.

Dr. Corley (closing the discussion). I have often presented this matter in as-

sociations in order to urge discussion, but this is the first time that I have been rewarded with success. It has seemed impossible to make it strike fire and to awaken the members of the association and to have them say something, if it were only to condemn it. Dr. Meadors and the others were right when they said that I intentionally overdrew the picture so that I might make you realize the necessity for discussing the subject. I was delighted with the very ably presented essay of Dr. Carr, and especially was I pleased with his description of his method of teaching prophylaxis to the patient. Prophylaxis does not mean the same thing to every man. Some men consider prophylaxis as the outcome of the dentist's manipulations. To my mind it is due more to the work of the patient than to that of the dentist. As to first cleaning the mouth, it has never been my practice to clean the mouth. If the mouth is unclean, that uncleanliness is due to the presence of foreign matter. Fermentable decomposable matter in contact with the teeth is the cause of caries. If we clean the teeth now, they are unclean in ten minutes, or as soon as the patient has eaten. I take the position that the man who does not first send the patient home with instruction as to the technique of the dental toilet, and with the necessary paraphernalia, does not deserve the title "Doctor." The first thing a patient should do is to provide himself with half-a-dozen brushes of different shapes and sizes. I would also stress the importance of the dentist providing himself with a set of models showing the irregularities of the teeth, and how they should be cleaned. Take one of these models and rub over the surfaces of the teeth something like wet cornmeal and then with a piece of cotton, brush over the crowns and show the patient where these teeth are left unclean after mastication. Show the points that are kept clean by chewing, and then show how by the rinsing of the mouth, the bulk of the adhering food can be removed provided this is done immediately after eating and before the food becomes mucilaginous and sticky. Then, after rinsing the mouth, show how, with the orange-wood toothpick, the patient can clean the interstices between the teeth, removing food which cannot be removed with floss. Demonstrate the use of the floss, the use of the tooth-brush, and then show the use of the brushes on the models. Send the patient home to clean his teeth. Tell him not to do this for method's sake, but for the sake of preserving the teeth, by cleaning them, and by removing every foreign body. Then tell him to come back to you in a few days, and you will do like the good Nazarene, who, when He walked among men, did that which they could not do for themselves. I tell my patients that I will remove the tartar, polish off all the little irregularities that catch food, and then they must do the rest. I do not clean teeth any more than I clean the patient's backyard. That is the duty of the patient. Of course we must have the patient come to us at intervals to see that they are doing it correctly, and if not, must show them why they are unsuccessful.

In regard to immunity, there is a principle which we do not understand. I do not know whether I can elucidate it or not, but I do know some methods by which we may develop in our own bodies the immunizing power. The first principle in gaining this power is activity.

If the act of mastication be correctly performed the principles of immunity will be developed. Aside from the massaging and cleansing effect of the food, the act of mastication develops such a force that there will be a certain degree of immunity. In many cases where we see a certain degree of immunity and in which the mouth is not cared for by the patient, the arches are almost always perfectly symmetrical and the teeth are so regular that there are practically no places for the lodgment of the food. The act of mastication alone cleanses such mouths.

The patient, gentlemen, has to keep his mouth clean himself. If I put the mouth in a condition where the patients can keep it clean, and if they fail to do so, I tell them to go to someone else for their dental services.

The President then announced the report of the chairman of Section II (Prosthetic Dentistry), presented by Dr. W. R. Wright, Jackson, Miss., as follows:

Report of the Committee on Prosthetic Dentistry.

By W. R. WRIGHT.

It has been the aim of this section to present for your consideration essays and a written *résumé* of dental literature, together with a few thoughts and suggestions that might be of sufficient interest to engage the time and thought of the association. To this end the chairman has used every reasonable effort at his command to secure essays, but without success. Quite a number of men who were requested to contribute will show by actual demonstrations, rather than by written explanations, their skill in the work included in this section. This method, I trust, will appeal to your favorable consideration.

The profession of dentistry has advanced in a very marked degree during the past decade. The American dentist is in the lead in regard to progress, making it very clear that if there ever was a doubt in some minds that our profession ranked high in the great professions and the fine arts, the present period of development has dispelled the doubt, and our position is founded on safe ground.

A brief review of the history and literature of the profession shows us that many theories passed into disuse as mature thought and practice determined their unfitness for practical usefulness. We are told by Dr. I. C. Curtis (*Cosmos*, October 1907, p. 1041) that plaster of Paris was first used for impressions by Dr. Westcott in 1844. In 1847 the American Society of Dental Surgery expelled some of its members for using amalgam as a filling material and preservative of tooth-structure. A few years later, continuous-gum work for artificial dentures was first used. In 1866 it was claimed and *proved* that the wearing of a vulcanite plate would cause salivation, and as late as 1874 an eminent authority claimed that a water-tight filling could not be made with cohesive gold. In the same year the Illinois legislature was requested to pass laws that would prohibit the insertion of amalgam fillings. These references go to show that we should not be too quick in condemning new ideas; let them be put into practice, and

if they have any merit it will soon be evident. We have extremists, it is true, but we could not get on without them; they are the true pathfinders of the profession.

As has already been stated, the progress of dentistry has been especially marked during the past few years, and while there has been a general advance in all the various branches of dental science, a remarkable growth has been very noticeable in prosthetics. The date of the origin of the laboratory—or, as it is now called, cast—filling is not positively known. Dr. S. W. Foster of Georgia read a paper at Old Point Comfort in 1894 in which he described a method of making a laboratory filling. (*Cosmos,* vol. xxxvi, 1894, p. 720.) Dr. C. L. Alexander of North Carolina, before the Southern Dental Association at Asheville, July 28, 1896, read an elaborate paper accompanied by beautiful illustrations, many of which are to be found in the text-books of today. To him much credit is due for the development of the cast gold filling. The principal objection to the Alexander method was that it invariably failed in unskilled hands.

Dr. Alexander deserves undivided credit for the hood abutment and bar for partial plates. It is unnecessary to emphasize the great advantage of the hood method; its usefulness is too well known. These methods have been fully described in *Cosmos.*

There is enough glory surrounding the cast gold filling to leave a liberal share to Dr. W. H. Taggart of Chicago, who seems to have rendered its use possible in the hands of operators who are less skilled than those who used the earlier methods. Dr. Taggart demonstrated his method before the New York Odontological Society, January 15, 1907, and succeeded in making in twenty minutes an approximo-occlusal inlay for a bicuspid. (*Cosmos,* vol. xlix, 1907, p. 1117.) Many methods and machines for this class of work are now being offered to the profession, each having special features; the one to be generally accepted is yet to be determined by further experiment.

An unorganized effort has been made on the part of the profession to arouse interest for an improvement in artificial teeth. The general opinion is that it is possible to manufacture teeth that would conform more closely to nature. Dr. J. Leon Williams of London writes very interestingly on this subject. (*Items of Interest,* vol. xxix, p. 841.) It is generally believed that the time has arrived when it is necessary that the association as well as the smaller dental societies should take some steps toward securing a better selection of artificial teeth and more adaptable and efficient sets. I cannot conceive of any better work for this association than to institute a contest in tooth-carving. A committee should be appointed to carefully examine all specimens submitted, and select those that have merit. If these selections meet with the approval of the profession, the manufacturers will be glad to put them on the market.

Owing to the general use of platinum solder and to the more and more frequent application of the casting machines there is a demand for a high-power blowpipe. This can be obtained, says Dr. H. J. Morris of Sheffield, England, by attaching the air-supply tube of the blowpipe to a cylinder of N_2O, thereby obtaining a mixture of (coal) gas and N_2O. With this arrangement it is said that steel burs can be melted in a few minutes.

Several scientific papers have lately

been given to the profession on the movements of the mandible during mastication, and on the arrangement of artificial teeth. Notable among these is a report by Dr. J. H. Prothero of Chicago, *Dental Review*, vol. xxii, No. 3, p. 179, and *Dental Summary*, vol. xxviii, No. 2, p. 97; also the report by Geo. B. Snow of Buffalo, New York, can be found in the *Dental Digest*, vol. xiii, p. 811. This subject has been too much neglected. Bowich and Luce of Harvard, in 1889 published a report in the *Boston Medical and Surgical Journal*, which failed to reach and benefit the dental profession to any great extent. Bonwill's efforts and research work extended over many years and was of great benefit to the profession. In 1894-95, Dr. William Earnest Walker, then of Mississippi, now of New Orleans, La., carried out a similar series of experiments on the living subject. His report was published in the *Dental Cosmos* in 1896-97, and still stands as the best and most scientific treatise on jaw movements. As far as the records show, Dr. Walker was the first to recognize the importance of measuring the inclination of the condyle path, and the need of an occluding frame capable of producing the mandibular movements peculiar to each individual patient. To this end he had manufactured an occluding frame which was a modification of that of Bonwill, and is known as the Walker-Bonwill.

It would be tiresome to the association to hear a full report of all the excellent essays that have appeared in the journals during the last twelve months. The above have been mentioned because we believe that they represent the *vital* thought of the profession today. In closing, let me call your attention to a few other articles that will bear careful examination.

Dr. H. J. Goslee of Chicago, in an article entitled "A Perspective View of Crown and Bridge Work," in *Items of Interest*, asks six important questions, *i.e.* "Should pulps in teeth which are to support artificial crowns be devitalized as a procedure incident to the preparation of such teeth, or not? Should a crown be made with a collar, or not? Should a band when used extend beyond the gum margin, or not? Should we destroy or mutilate the beautiful crown of a sound tooth for the purpose of obtaining support for a bridge, or not? If this is not warrantable, should we use an open face crown, a so-called hood, or groove attachment, or some other method? Should we use a fixed or removable structure in the building of our bridges?"

See also—

"The Cause of Failure and Success in Crown and Bridge Work," by H. J. Goslee, *Dental Summary*, vol. xxvii, p. 545.

"Mistakes and Failures in Bridge Work, and Some Remedies," by Frank E. Logan, *Dental Summary*, vol. xxvii, p. 577.

"Crown and Bridge Work," by Wm. H. Cudworth, *Dental Summary*, vol. xxvii, p. 586.

"The Soldered Porcelain Facing 'Checked'—Causes and Remedies," by Clarence J. Grieves, *Cosmos*, vol. l, 1908, p. 197.

Discussion.

Dr. H. T. Stewart, Memphis, Tenn. The task assigned to Dr. Wright was a very important one and one very hard to fill. He has been faithful in reviewing the literature of the profession. In this work it is not so hard to decide what to put into the review as it is to decide what to leave out. One of the most im-

portant subjects Dr. Wright brought up is that of the tooth-forms which we have to use. There is certainly a deficiency in the manufacture of tooth-forms, as all readily realize when selecting teeth for bridge work, and his suggestion as to arousing the dentists' interest in this subject is a very good one, because this very essential feature has been unduly neglected.

It was very timely to call attention to Dr. Walker's modification of Dr. Bonwill's articulator and his study of the movements of the lower jaw. Dr. Walker's most admirable work is well worthy of very careful study by every member of the profession.

Dr. Wm. Crenshaw, Atlanta, Ga. I had the privilege of reading this report before it was presented, and it gives me much pleasure to indorse Dr. Wright's words. With reference to deciding what writings on different subjects should be included, the author has delved into this matter with great care. I do not wish to discuss the problems Dr. Stewart referred to, although the necessity for new forms must be apparent to all, but I would say a few words with reference to the originator of the cast inlay. The credit for this invention should be given to whom it belongs. Dr. Wright does not undertake to decide this question, but merely opens the subject for discussion. I believe the credit for the gold inlay, not the cast inlay as it is being made just now, but the origin of it, the possibility of using gold as an inlay as is quite common now, is due to Dr. Chas. L. Alexander. Dentists of my age, and men who have practiced even longer, will agree that he is the father and the pioneer of the modern gold inlay. As has been already indicated, he has not worked out the methods now in vogue, but the evolution of the modern gold inlay is in my opinion the result of Dr. Alexander's work.

I shall not attempt to discuss the merits or shortcomings of inlays further than to say that the inlay presents a problem, like cataphoresis and like other dental innovations that come and go. Inlay work is being overdone; it has its limitations, as the future will show, but the cast gold inlay and the fused porcelain inlay undoubtedly mark great advances in the science of dentistry. They are a permanent inheritance, which will prove to be of great benefit to those who follow conservative methods, and are a decided step in advance of anything that has been done in the practice of operative dentistry during the past fifty years.

Dr. F. A. Johnston, Sheffield, Ala. There are only one or two points in Dr. Wright's paper that I wish to discuss. One is the anatomical articulator mentioned, and Dr. Walker's work in that field. It is of course a matter of pride to us southerners that Dr. Walker took the lead of the profession in this work. Dr. Prothero of Chicago, whose work is of great interest to the profession, has given him full credit for his achievements.

I do not care for making artificial teeth for patients. Yet we all have to make teeth that must be constructed on scientific principles. Dr. Prothero in his work clearly shows how the movements of the lower jaw depend on the articulation of the teeth, and how the articulation of the teeth should be governed by the movements of the jaw during the act of mastication, and how a three-point contact should be secured in the articulation so that in the movements of the jaws the teeth will come into contact at three points.

Dr. Goslee of Chicago asks whether we should cut off the crowns of teeth that are to be used in bridge work, and, if not, whether the pulps should be devitalized or not, when the teeth are used as abutments. My answer to that is emphatically No. There are methods of anchorage in bridge work that obviate the necessity of cutting off the crown, and I do not think that the banded crown offers a great advantage in the construction of bridge work.

I once asked an eminent dentist what he thought of the practice of devitalizing all teeth that are to be crowned which is advocated by certain men, and his answer was that these men think more of their reputation than of their patient's benefit.

Dr. S. W. Foster, Atlanta, Ga. Dr. Crenshaw has mentioned a point in connection with my name, and I indorse his words. The essayist said that the first publication on the inlay or metal filling appeared in the *Dental Cosmos* in 1894, which was written by me. He also mentions that Dr. Alexander two years later published an article on the same subject. Some months ago my attention was called to my paper being the first publication on this subject. I would, however, not have the profession at large think for a moment that I am the real originator of this wonderful method of cast inlay or cast filling which Dr. Alexander has so well-nigh perfected. I remember very distinctly that after my paper had been read, Dr. Alexander came to me and said, "Foster, that is a good idea. I have been doing the same thing for a year or two and have had some wonderfully satisfactory results." While I am credited with having published the first essay on this subject, there is no question that Dr. Alexander had been doing inlay work previous to my publication. I moved to Atlanta a few months afterward and drifted out of the habit of doing inlay work, but Dr. Alexander wrought a revolution in dentistry, and to him belongs the honor of having originated the cast metal inlay.

The President appointed as the members of the Executive Committee *pro tempore,* Drs. D. H. McNeill, W. K. Slater, and W. R. Wright.

The following were appointed as the Committee on Necrology: Drs. G. S. Tignor, N. N. Vann, and A. C. Strickland.

The meeting then adjourned until the evening session.

FIRST DAY—Evening Session.

The meeting was called to order Tuesday evening, May 12th, at 8 o'clock, by the president, Dr. Melendy.

The President announced as the first item for the evening the following paper by Dr. Burton Lee Thorpe, St. Louis, Mo., on "The History of the National Dental Associations of the United States":

The History of the National Dental Associations of the United States.

By BURTON LEE THORPE.

That the organized professional society has been one of the most potent factors in our profession's history, from an educational standpoint, none can question.

The frequent meeting for the interchange of ideas, the airing of news, the exploding of errors, the dissecting of theories, the shattering of hobbies and the demonstrating of various methods have so broadened the minds of men that today the local, state, and national society are but a post-graduate school for the busy practitioner.

If we look backward seventy years, to the time when our calling blossomed from a trade into a profession—which event was brought about by the inauguration of the *American Journal of Dental Science* (1839); the Baltimore College of Dental Surgery (1839), and the American Society of Dental Surgeons (1840)—we find a time when practitioners were few and far distant, methods crude compared to now, and secrecy, selfishness, and charlatanism predominated among the majority of our craft.

Americans have been progressive in developing our profession and bringing it out from the chaotic and obscure condition it was in seven decades ago. The first American dental society for mutual improvement was likely held around a Revolutionary camp-fire during the winter of 1781 and '82, while General George Washington's troops were in winter quarters at Providence, R. I., when Joseph LeMaire, the French patriot and surgeon-dentist, who came to America with the fleet of Count Rochambeau, instructed in the dental art James Gardette, a fellow patriot and dentist, and Josiah Flagg (grandfather of the late Prof. J. Foster Flagg of Philadelphia), who is honored as being the first native-born American dentist. These three patriots improved their time by comparing methods, and in practical demonstrations, and combined the "first school of dental instruction" and the first dental society into one while in winter quarters with General Washington.

The first local dental societies were one in New York city, organized in 1837, and another in Virginia, organized in 1842—the New York Society of Dental Surgeons and the Virginia Society of Surgeon Dentists. Both were short-lived.

Some have truly said we are the by-product of traveling tinkers, barbers and blacksmiths, but if we review carefully the *personnel* and the careers of the men who are the real makers of dentistry, we can but realize the culture, skill, and professional characteristics possessed by those men who were the master-minds and leaders in thought and action. To Horace H. Hayden, known as "the father of the American Society of Dental Surgeons," belongs the honor of conceiving the idea of the formation of a national society of dentists. He first broached the idea as early as 1817, but, as he said, "the

pear was not ripe," so from time to time he renewed his efforts. It is he who is known as the "progenitor of the science and art of American dental surgery." He took the initiative in founding the first dental college and the first dental journal, and after consultation with his professional brethren in the eastern cities, who favored his idea of an association of dentists, he issued a call for a meeting of organization. At the American Hotel, New York city, August 18, 1840, at 10 A.M., the following members of the dental profession assembled:

Present personally: Horace H. Hayden, M.D., Baltimore; L. S. Parmly, New Orleans; Elisha Baker, New York; Patrick Houston, M.D., Charleston, S. C.; Eleazar Parmly, M.D., New York; John Lovejoy, New York; Chapin A. Harris, M.D., Baltimore; Augustus Woodruff Brown, New York; Chas. O. Baker, New York; J. Smith Dodge, New York; Enoch Noyes, Baltimore; Vernon Cuyler, M.D., Hartford, Conn.; Solyman Brown, New York; Jahial Parmly, New York, and Joseph N. Foster, M.D., New York.

Present by proxy: Lewis Roper, M.D., Philadelphia; Daniel Harrington, Philadelphia.

Present by letter: J. McIlhany, Philadelphia; William Arnold, M.D., New York; E. B. Gardette, Philadelphia; Edward Maynard, M.D., Washington City; Edward Hudson, M.D., Philadelphia; Jas. S. Gunnell, M.D., Washington City; Isaac J. Greenwood, New York; Josiah F. Flagg, M.D., Boston, and S. Spooner, New York.

Present by invitation: Leonard Macall, M.D., Baltimore; John Trenor, M.D., New York; Elihu Blake, New York; Dr. — Greenwood, Boston; N. C. Keep, Boston; Daniel Harwood, M.D., Boston; Samuel W. Parmly, New York; E. G. Tucker, M.D., New York; R. Burr, Philadelphia; F. B. Chewning, Richmond, Va.; S. M. Sheppard, Petersburg, Va.; Joshua Tucker, M.D., Boston.

These men represented the very best of the profession in America at that period.

Horace H. Hayden of Baltimore called the meeting to order by nominating Elisha Baker, of New York city, as chairman, and Solyman Brown, the poet laureate of the dental profession, secretary.

Chapin A. Harris, an intellectual giant of thirty-four years, afterward known as the "father of American dental surgery," offered a resolution as follows:

RESOLVED, That it is the opinion of this convention that the science of dental surgery would be advanced, and the interests of all well-informed practitioners and the community at large promoted, by the formation of a national society of dentists; therefore

RESOLVED FURTHERMORE, That in order to the accomplishment of this object, a committee consisting of three persons be appointed by the chairman of this convention, to prepare the form of constitution for such a society, with instructions to report the same as soon as they shall have performed their duty.

The resolution was passed, and Chapin A. Harris, Solyman Brown, and Vernon Cuyler were appointed a committee on constitution and by-laws. While they were engaged in the preparation of the constitution, Dr. Hayden spoke as follows:

He remarked that the formation of the National Society of Dentists had been long a favorite project with himself; and he was happy to say that he had never found himself wholly alone in this desire. Many years ago he had consulted with the elder Hudson of Philadelphia, who was favorably inclined to such an occasion. On a visit to Boston and other eastern cities he had consulted his professional brethren on the same question. He found them ready to co-operate in any practicable scheme for the elevation of the profession, but they were inclined to doubt whether anything useful could be accomplished by any other than individual efforts. Of any advantages that could result from associated influence they were mostly skeptical, especially in Boston; it was somewhat otherwise

with a few of the profession in the city of New York. Here several of his brethren were anxious to disseminate knowledge, cultivate social intercourse, and make an effort to elevate the profession of dental surgery from its present neglected condition to the dignity of a science. In Philadelphia, Baltimore, Washington, and a few other cities his plan was received with favor by some of the individuals with whom he consulted.

The speaker adverted in the next place to the condition of the dental art at the time he entered upon its duties forty-three years before. Then, said he, the name of dentist was a reproach and a byword; but he resolved that his son, whom he intended to educate to his own calling, should find the profession so far improved and exalted as that it should be no longer a disgrace to be called a dentist. To this end he inquired of the elder Greenwood of New York for books on the subject of dental theory and practice. That gentleman informed him of the work of John Hunter, which he procured. Soon afterward he obtained possession of some few other works, both in French and English. From that time he has seen the science assuming more and more importance in the public eye, while men of learning, worth, and genius have been added from year to year to the rank of its professors.

At the present period, continued the speaker, renewed efforts are making in England, France, and Scotland, to place our profession on still higher ground than it has yet attained; and shall we of these United States of America remain inactive in this grand endeavor? For myself, I cannot brook defeat in this favorite undertaking. I prefer rather to make renewed and redoubled efforts to secure success. If, like the Jews, we are scattered and despised, may we not, like that persecuted people, at least hope for a day of restoration to our promised land? There are, indeed, many obstacles to still overcome. A new race of Canaanites must be expelled from our borders. Many errors must be exploded and much ignorance must be dispelled, before the light of truth will beam clearly upon our path; but with diligence, zeal, and perseverance, we are certain of ultimate success. Let us, therefore, go forward in the good cause, unintimidated by the skepticism of the faithless, the fears of the timid, or the apathy of the selfish. If there are some who prefer to plod onward in the path of private enterprise, let us unite our efforts in one great social endeavor to elevate our profession from the degraded condition to which it has sunk, and in which it must ever remain until the high-minded and well-educated among its practitioners shall unitedly arise and shake themselves from the dust.

Dr. Hayden then offered a resolution that the secretary proceed to the reading of the constitution, as reported by the committee appointed for that purpose; whereupon the secretary, by order of the chairman, read as follows:

(Preamble.)

Constitution.

ARTICLE I—Of the Objects of the Society.

The objects of this society are to promote union and harmony among all respectable and well-informed Dental Surgeons; to advance the science by free communication and interchange of sentiments, either written or verbal, between members of the society, both in this and other countries; in fine, to give character and respectability to the profession by establishing a line of distinction between the truly meritorious and skilful, and such as riot in the ill-gotten fruit of unblushing impudence and empiricism.

ARTICLE II—Of the Name of the Society.

The society shall be known and designated by the name and title of The American Society of Dental Surgeons.

ARTICLE III—Of the Officers of the Society.

Section 1. The officers of the society shall consist of a President, and three Vice-presidents, a Recording and a Corresponding Secretary, a Treasurer, a Librarian, an Executive, an Examining and a Publishing Committee.

Sec. 2. The election of the above-named officers shall be by ballot, at a regular annual meeting of the society—a majority of votes determining the election.

ARTICLE IV—Of Members of the Society.

There shall be two classes of members known and recognized as Acting Members or

Fellows, and Honorary Members; the former consisting of those who subscribe this constitution either personally or by proxy, and pay into the treasury the annual dues required by this constitution; and the latter embracing such members as are merely elected to membership.

ARTICLE V—Of the Requisitions of Members.

Section 1. Each and every acting member of this society shall either have been such by virtue of his attendance in person, by proxy, or by letter, at the time of its formation, or as shall be afterward elected as prescribed by this constitution, and subscribe to the same.

Sec. 2. Each and every acting member shall pay into the treasury of the society the annual sum of five dollars, for the benefit of its funds.

Sec. 3. Each and every acting member shall be required to attend the society at least once in three years, unless excused by the society.

ARTICLE VI—Of the Election of Members.

Section 1. All members of the society, excepting those who were acting members at the time of forming the same and establishing this constitution, shall be elected as follows, viz: The candidate for membership shall be proposed at a regular meeting by the Executive Committee, whereupon two tellers shall be appointed by the presiding officer, who shall collect the ballots, consisting of slips of paper having plainly written on them, either *yea* or *nay*. In case two-thirds of the members present shall vote in the affirmative, the candidate shall be declared to have been duly elected a member of this society.

ARTICLE VII—Of the Expulsion of Members.

Section 1. Any member of the society may be expelled for immoral conduct, malpractice in business, or other sufficient cause, on motion of one member seconded by another, at any regular meeting of the society, in which case a majority of three-fourths of the members present shall be required.

ARTICLE VIII—Of the Meetings of the Society.

Section 1. The meetings of the society shall be held annually by adjournment, from time to time and from place to place, agreeably to the will of the society.

ARTICLE IX—Of the Resources of the Society.

Section 1. The society may receive contributions of money, books, or other property, which may be either used or sold in aid of its purposes.

Sec. 2. Each and every candidate examined and admitted to membership shall pay to the Treasurer a fee of twenty-five dollars, before receiving his diploma.

Sec. 3. Each and every person who shall become an active member of the society by election shall pay ten dollars for the benefit of its funds, which shall entitle him to a diploma.

ARTICLE X—Of the Disposition of the Funds of the Society.

Section 1. The funds of the society may be appropriated to the purchase of lands, tenements, chemical or philosophical apparatus, the publishing of books, tracts, and other papers and documents; and to such charitable objects as shall hereinafter be enumerated.

ARTICLE XI—Of the Distribution of the Effects of this Society, in the event of its final Dissolution.

Section 1. In case a dissolution of the society shall at any time be proposed, a meeting shall be called specially for that purpose, and the consent of three-fourths of its members be required to effect it.

Sec. 2. Should this society thus be dissolved by its own act, the property belonging to it shall be sold by order of the President, or by any three fellows who shall obtain authority from a majority of the living and subscribing members, and the assets of sale shall be equally divided among the subscribing members.

ARTICLE XII—Of the Indispensable Qualifications of Candidates who have never yet entered upon Professional Practice.

Section 1. The candidates shall be at least twenty-one years of age; shall have a good English education; shall produce evidence of unexceptionable moral character; and shall have studied and practiced for the full term of two years with some practical dentist known as such to this society.

Sec. 2. No candidate for membership, who has the diploma of any Dental College, regularly chartered in any of the United States, shall be subjected to re-examination by the Examining Committee of this society; but

shall be entitled to a diploma by complying with the by-laws.

ARTICLE XIII—Of the Quorum required to Transact Business; and of the contingency of there being No Quorum present at any meeting.

Section 1. Seven acting members, or fellows, of the society, besides the President or chairman, shall be necessary for the transaction of business, at the opening of any annual meeting.

Sec. 2. In the event that a quorum cannot be obtained at any regular meeting of the society, the time of meeting on the following year shall be the second Tuesday of August, and the place the same as on the preceding year.

ARTICLE XIV—Of the Charitable Objects of the Society.

Section 1. Any surplus moneys in the treasury may be appropriated, at any regular meeting of the society, for the aid and relief of the widows and orphans of deceased members; or for the benefit of living members reduced to want by sickness or other calamity; it being provided that no such appropriation shall be made without the consent of two-thirds of the members present.

Sec. 2. Other charitable or patriotic appropriations may be made at any regular meeting of the society, by a majority of three-fourths of the members present.

Sec. 3. The President may at any time give pecuniary assistance to any member, or to the surviving family of any deceased member, out of any moneys in the treasury, deposited there by benevolent individuals.

ARTICLE XV—Alterations and Amendments of this Constitution.

Section 1. Any alteration, amendment, or revision of this Constitution may be made at any regular meeting of the society, by the joint assent of three-fourths of the fellows present at such meeting.

Horace H. Hayden, P. Houston,
Eleazar Parmly, Enoch Noyes,
Vernon Cuyler, Jahial Parmly,
Elisha Baker, Solymon Brown,
John Lovejoy, J. Smith Dodge,
L. S. Parmly, Joseph H. Foster,
Chapin A. Harris, A. Woodruff Brown.
Charles O. Baker,

The foregoing constitution having been read, article by article, and amended, was unanimously adopted.

By-laws.

ARTICLE I—Of the Duties of Officers.

Section 1. It shall be the duty of the President to preside at all meetings of the society, when present; to sign the diplomas conferred on members during his term of office; to confer all honorary distinctions awarded by the society, whether degrees of Dental Surgery, medals or other testimonials; and to draw upon the Treasurer for all moneys appropriated by the society.

Sec. 2. It shall be the duty of the first Vice-president to preside at all meetings of the society in the absence of the President; and to perform the other prescribed duties of the president, in case of his death, resignation, sickness, or other disability.

Sec. 3. It shall be the duty of the second and third Vice-presidents to perform the duties of the above-named officers during their absence or inability.

Sec. 4. A president *pro tem.* shall be appointed to preside at any meeting where the President and Vice-presidents are all absent.

Sec. 5. It shall be the duty of the Recording Secretary to note in a book kept for the purpose, all the proceedings of the society during the term of his office, and to furnish copies of any parts thereof at the order of the President or his substitutes; and also, to deliver the said book and proceedings to his successor in office. He shall also keep the seal of the society, together with the copper-plate from which diplomas, certificates, or degrees are struck; also all the records belonging to the society, designed to be preserved; and he shall furthermore countersign all diplomas, and set the seal of the society to all instruments requiring the same; he shall also notify every member of the time and place of meeting of the society, at least two months before the time of said meeting.

Sec. 6. It shall be the duty of the Corresponding Secretary to conduct the domestic and foreign correspondence of the society, in accordance with the advice of the President or the express will of the society communicated to him by the Recording Secretary, and at his own discretion in cases of emergency, provided it does not interfere with any of the prescribed rules of the society.

Sec. 7. It shall be the duty of the Treasurer to keep all the moneys of the society committed to his trust; to pay them over to the order of the President, countersigned by the Secretary, and to keep a correct account of the same in a book or books kept for that purpose.

Sec. 8. It shall be the duty of the Librarian to keep the books belonging to the so-

ciety's library; to obtain insurance on the same, and to take receipts of all persons who receive books from his hands by order of the society; and in case of failure of the member receiving such book to return it in twelve months, he shall forfeit, and pay to the society, four times its price.

Sec. 9. It shall be the duty of the Executive Committee to examine the accounts of the Treasurer, and report the same to the society at its annual meetings; to see that all the rules and regulations of the society are duly enforced and executed; and it shall also be the duty of such committee to inquire into the professional reputation and character of all candidates proposed or who may apply for membership, and report the same to the society, which, being satisfactory, such candidates shall be balloted for, for admission into the same.

Sec. 10. It shall be the duty of the Examining Committee to appoint a time and place, at least once in each year, for the examination of applicants for the degree of Doctor of Dental Surgery; to examine such persons strictly and faithfully in relation to their qualifications to enter upon the practice of the profession; and their certificates shall entitle the holder to receive the diploma of the society conferring the degree of Doctor of Dental Surgery.

Sec. 11. It shall be the duty of the Publishing Committee to superintend the printing and publishing of all books, tracts, and other documents issued by the Society.

ARTICLE II—Of the Emoluments of Office.

Section 1. No officer shall receive any emolument unless in cases of special appropriation, excepting the Recording Secretary, whose duty it shall be to attend the meeting of the society next subsequent to his election; and who shall be entitled to his traveling expenses and the sum of five dollars *per diem* during his necessary absence from business, in all cases where he is compelled to leave his place of residence.

ARTICLE III—Of the Powers vested in the Vice-presidents.

Section 1. Each of the Vice-presidents may, if there be a sufficient number of the members of this society residing in his immediate vicinity, convene them at any time, and when so convened they shall have power to elect such officers from among their own number as may be necessary for the transaction of whatever business of a local nature may come before them; and it shall be obligatory on them to report their proceedings regularly at each annual meeting of the parent society.

ARTICLE IV—Of the Privileges of Members.

Section 1. Each and every Member or Fellow of the society shall be entitled to debate and vote on all questions agitated at any meeting thereof, agreeably to the by-laws and standing rules and regulations of the society; and he shall moreover be eligible to any office in the gift of the society; and furthermore, he shall be entitled to a diploma, or degree of Doctor of Dental Surgery.

Sec. 2. Each and every Honorary Member shall be entitled to a seat at all meetings of the society; shall have the privilege of debating all questions not involving pecuniary expenditure; and shall receive the diploma, or degree of Dental Surgery by paying therefor to the Treasurer of the Society the sum of Ten Dollars.

ARTICLE V—Of the Appointment of Members to certain Duties.

Section 1. It shall be the business of the society, at each annual meeting, to appoint five of its members to prepare dissertations on some subjects connected with the profession; and also one member to deliver an opening address at the subsequent meeting.

Sec. 2. It shall, moreover, be the duty of the society, from time to time, to appoint certain individuals to prepare essays or any other documents ordered by the society.

ARTICLE VI—Of Awarding Premiums.

Section 1. This society may award premiums to members for Dissertations on subjects that may at any time be specified by the society at an annual meeting; also, for important improvements in Mechanical Dentistry, and the Manufacture of Incorruptible Teeth; and also for any other suitable object.

Sec. 2. The question of preference in all such cases shall be determined by the judgment of a special committee appointed by the society.

Sec. 3. Unsuccessful dissertations shall be at the disposal of their respective authors.

ARTICLE VII.

Section 1. No member shall speak more than twice to any question, without express permission of the society, and then only fifteen minutes at each time.

Sec. 2. Any member shall be liable to be called to order for personal recrimination of

any other member; or for wandering in his remarks from the subject of debate.

ARTICLE VIII.

These By-laws may be altered or amended, at any annual meeting of this society, by a vote of two-thirds of the members present.

Following this, Eleazar Parmly, one of the shining lights of dentistry, in highminded and prophetic language, spoke as follows:

I feel myself happy in being of the number of those whose names shall be transmitted, in the act which we have just performed, to the latest posterity, and whose memories will live in the history of our profession long after our mortal remains shall have been gathered to the home of our fathers. We can easily imagine the glow of patriotic enthusiasm which animates, at this day, the hearts of those who can trace the blood which flows in their veins to the heroes of the American Revolution who signed their names to that great political document which secures to us our national independence. And why is it that this exulting self-congratulation and honorable pride are felt by the descendants of that band of patriots whose memories shall live in the hearts of their countrymen as long as they remain? It is in consequence of the struggles through which they passed in order to acquire the power of calling themselves a free and sovereign people, and of the sacrifices which they made for the good of their common country.

Will not a similar feeling kindle in the breasts of those who shall come after us, when a small pamphlet shall fall into their hands, either by accident or design, bearing the names of those individuals of this assembly to whom they can claim the affinity of kindred blood?—may not a noble pride be felt by our children, and even by our children's children, when they read that their ancestors were of the little band who met, from distant cities, to rescue a noble science from degradation to which it had been reduced by ignorance, selfishness, and quackery? And will it be no source of pleasing recollection to ourselves in the subsequent stages of our existence, that on such a day of such a year we met each other in this place, and signed a document which declared ourselves members of a profession which afforded ample scope for all the moral, intellectual, and physical energies of our nature engaged for the general good of our fellow men?

Our forefathers met with opposition and oppression in every attempt to establish their rights as men. We, too, have met in former years with indignities and sarcasm in every attempt to sustain our privileges as members of our profession. We have, I presume, all of us, the mortification to know that in this country, more particularly than in any other, the community at large have been accustomed to regard men—and gentlemen too—as unfit for the drawing-rooms of the rich and the fashionable, if they attach themselves to the profession which we are resolved to honor and to elevate. It is time to blot from the annals of society this degrading feature, and to claim for ourselves a full equality with the honorable avocations of our fellow men. We owe it to ourselves, and we owe it especially to our children.

The support of the constitution which has just been adopted is, in my opinion, an object worthy of our vigorous and united efforts. Personal fame and aggrandizement should never be allowed to constitute predominant ingredients in the composition of our professional ambition. Nobler motives shall animate our zeal while engaged in laying the corner-stone of a structure which, completed by our successors, shall at some future day command the respect, if not the admiration, of the world.

Without such an object our present undertaking would be unworthy of men, and our present meeting a schoolboy's amusement. But I trust we have come together, from different cities of the Union, with a settled determination to carry out in detail, with manly vigor, the objects proposed by that instrument which we have just declared to be a fit constitution for an American Society of Surgeon Dentists.

It will be to each of us a fresh stimulus to exertion that the failure of our plans is not only confidently predicted, but ardently desired by many whose professional ambition knows no impulse beyond a thirst for gold. Besides, should we fail in our object of giving character and consistency to the

profession; of imparting to it the form of a regular science; and of uniting its members for the common good, we shall discourage, perhaps, for years to come, a similar attempt. On the other hand, if by persevering diligence we not only deserve, but command success; if our proposed society shall effect the object we have in view; and if the prophets among our enemies, like those of Baal, should invoke in vain the interposition of their gods—then, indeed, shall we have performed a work worthy of the high ambition of Christians and of men, and the children who come after us shall not find themselves degraded by the calling of their progenitors.

The following officers were elected: Horace H. Hayden, M.D., *president* (he held this office four years, until his death, to be succeeded by Eleazar Parmly); Josiah Foster Flagg, M.D. (uncle and godfather of the late Prof. J. Foster Flagg), *first vice-president;* Eleazar Parmly, M.D., *second vice-president;* E. B. Gardette (son of the pioneer James Gardette of Revolutionary fame), *third vice-president* (he afterward declined to serve); Solyman Brown, A.M., *recording secretary;* Chapin A. Harris, M.D., *corresponding secretary;* Joseph H. Foster, M.D., *librarian.*

By resolution the society "approved of the Baltimore College of Dental Surgery, organized the year before, and will cooperate with the other friends of that institution in promoting its designs." Eleazar Parmly was appointed agent of the society to present a petition to the Legislature of the State of New York asking for a charter, with power of conferring the degree of Doctor of Dental Surgery. The writer has been unable to find any record that Dr. Parmly ever accomplished the task assigned him.

The society also voted to "approve the establishment and management of the *American Journal of Dental Science*, and will aid its distribution and design."

The entire time of the first meeting was wholly taken up with the business of organization.

The society adjourned to meet the second Tuesday of August 1841, at Philadelphia. At this meeting the *American Journal of Dental Science* passed from the control of its editors into the possession of the society, which directed it until 1850, when it was transferred to Dr. C. A. Harris, who became its editor and publisher. At this session Dr. J. H. Foster introduced by letter the following question for discussion:

> Are there cases in which it is essentially advisable and important that teeth should be filled, in which gold foil cannot be used and other articles be substituted, so as to preserve the teeth a sufficient time to compensate for the operation?

A committee was appointed to consider this question. They reported as follows:

> That the use of "lithodeon," "mineral paste," and all other substances of which mercury is an ingredient is injurious to the teeth, and that there is no tooth in which caries in it can be arrested and the organ rendered serviceable by being filled in which gold cannot be employed.

This report was unanimously adopted.

In 1843 the society resolved by resolution that the use of amalgam was malpractice. In 1844 the recording secretary was authorized to notify each member that the use of "mineral paste" had been declared by the society to be malpractice. In 1845 it passed resolutions and drew up the famous "Amalgam protest and pledge." This many refused to sign, some voluntarily withdrew, and some were expelled as the result. This question mainly took up the time of the society, and resulted in a continual internal warfare in its ranks. In 1850 it became apparent to the powers in control

that the society had taken the wrong course, and the pledge resolution was rescinded. The continual bickerings, the "red-tape" and ill feeling engendered from the past caused a lack of interest and waning of its influence, and on May 9, 1855, a preliminary resolution was adopted directing the president, Dr. Elisha Townsend, to call a meeting to consider the dissolution of the society.

This meeting was called, and met in Philadelphia, August 1, 1855, when the dissolution was discussed and referred to a committee, which reported adversely but was continued with power of future action, and the society adjourned to meet in New York on August 7, 1856.

At the time named, after several attempts to secure a quorum (which was finally obtained) the continued committee reported, "That we deem it expedient to dissolve this association, and that it be and is hereby adjourned *sine die*." This closed the career of the first dental society ever organized, after sixteen years of existence—it virtually having defeated itself.

The formation of this society had constituted a new epoch in the history of dental surgery, and not only rescued our profession from oblivion, but was the means of making our calling a science, elevating it to the level with other branches of medicine.

At first there was opposition to it by a few narrow-minded members of the profession who did not believe in giving freely of their knowledge to their fellows. Our forefathers possessed the same human weaknesses that we do, and they were not above the personalities, jealousies, and strifes that creep into all societies. The influence for good of the American Society of Dental Surgeons on the profession is incalculable; without it we today would not represent what we do as a profession. As long as the pages of dental history are read, future generations will pay tribute and honor to Horace H. Hayden—*the man who took the initiative!*—of whom Solyman Brown, the first recording secretary, said: "When he shall have been forgotten as a dental practitioner and physiologist, he will be remembered by his professional successors as the "father of the American Society of Dental Surgeons."

Too high a eulogy cannot be paid to him and the men who made the first "National Dental Association" and its successors what they are—a dental clearing-house for the interchange of ideas. We can but say of them as did he who uttered these words: "To me the greatest heroes of our profession are they who have given freely their knowledge of science and art to their professional brethren."

The American Dental Convention.

The American Dental Convention was organized on a broad, democratic plan, divested of the "red-tape" and jealousies that developed in the American Society of Dental Surgeons. The meeting of organization was held at the Assembly Building in the city of Philadelphia, at 10 A.M., August 2, 1855, in pursuance of a call emanating from some sixty dentists of Philadelphia and vicinity.

Dr. Elisha Townsend, the retiring president of the American Society of Dental Surgeons, was the most active in the organization of the American Dental Convention, and may rightly be denominated its father. His high professional standing and marked influence as an organizer materially aided in perfecting the organization.

At the opening session of the convention, on motion of Dr. W. H. Goddard

of Kentucky, seconded by Dr. W. H. Dwinelle of New York, the following gentlemen were chosen as officers for the temporary organization: President, Dr. John S. Clark of New Orleans; secretary, Mr. J. M. Crowell of New York.

On motion of Dr. Elisha Townsend, the president was requested to appoint a committee consisting of one delegate from each state represented, to nominate officers for the permanent organization of the convention. The chair named the following: Drs. J. McCalla of Pennsylvania, G. E. Hawes of New York, S. P. Miller of Massachusetts, Potter of Connecticut, G. C. Brown of New Jersey, W. H. Goddard of Kentucky, Chas. Bonsall of Ohio, Garrett of Delaware, C. O. Cone of Maryland, and Munson of the District of Columbia. To this committee the chair, Dr. J. S. Clark, was, on motion, added.

The committee returned in a few minutes and reported Dr. J. B. Rich of New York, as president; Dr. John S. Clark of New Orleans, vice-president; Dr. Charles Bonsall of Cincinnati, recording secretary, and Dr. J. H. McQuillen of Philadelphia, corresponding secretary. The report was accepted and nominations confirmed.

The convention now went into a regular organization, and, on motion of Dr. Parry, the chair appointed a committee of one delegate from each state represented to report a plan for a dental association. The members of this committee were: Drs. Clark, Louisiana; Munson, District of Columbia; Garrett, Delaware; Goddard, Kentucky; Cameron, Ohio; Marshall, New Jersey; Potter, Connecticut; Miller, Massachusetts; Hawes, New York, and Townsend, Pennsylvania.

The convention now took a recess for half an hour, at the end of which time the committee reported the following preamble and articles of association, which, after being received and read, were, on motion of Dr. Dwinelle of New York, taken up article by article, and after some discussion and slight alterations were passed, as follows:

Preamble and Articles of Association of the American Dental Convention.

At a National Convention of Dentists, assembled in Philadelphia on the second day of August 1855, for the purpose of consultation upon the measures best adapted to advance the science and the common interests and honor of the profession, the following plan of organization was adopted:

ARTICLE I.

The association shall be called THE AMERICAN DENTAL CONVENTION.

ARTICLE II.

The association is intended to promote professional and personal intercourse among those who are engaged in the cultivation and practice of dentistry throughout the world, to advance the cause of dental education, and systematize and strengthen the exertions of its friends, and by a mutual interchange of opinions and experience to advance the knowledge and liberalize the relations of the members.

ARTICLE III.

The Convention shall consist of the members of this convention who shall sign these Articles of Association, and of such other practitioners of dentistry and auxiliary branches of science as shall hereafter be elected to membership and in like manner sign these Articles.

ARTICLE IV.

Candidates for membership shall be nominated by a member of the Convention at any of its meetings, and every such candidate as shall receive a majority of the votes cast upon the question of his admission shall be declared duly elected.

ARTICLE V.

The stated meetings of this Convention shall be held once every year on such day and at such place as the Convention shall at each session appoint for the next meeting.

ARTICLE VI.

The Officers of this Convention shall be a President, Vice-president, Recording Secretary and Corresponding Secretary and Treasurer, all of whom shall be elected to serve for the ensuing year, on the first day of the annual session, or on such other day of the session as may be appointed by the Convention; and the officers incumbent shall hold their offices and exercise the functions thereof until their several successors shall be elected and installed.

ARTICLE VII.

The Vice-president shall in the absence of the President, or in the event of his death or resignation, perform all the duties of the President; and in the absence or death or resignation of the President and Vice-president, the Corresponding Secretary shall serve as President *pro tempore*.

ARTICLE VIII.

All elections shall be determined by a majority of the votes cast by the members present, and the manner of voting shall be either *viva voce* or by ballot, as the Convention shall at the time determine.

ARTICLE IX.

A committee to prepare business for the session shall be appointed by the President elected for the year then expiring, which committee shall consist of one member from each state represented.

ARTICLE X.

The business committee provided for in Article IX shall be the standing committee of reference for all essays and papers proposed to be read by members before the Convention, and shall report their number, subjects, and length to the President, with their advice as to the order most expedient to be observed in presenting them to the Convention; and the President shall thereupon appoint at his discretion the time at which they shall be read—provided that it shall always be competent to the Convention to assign by resolution any other time for the reading of such papers, or to postpone such reading indefinitely; and the Convention may also by resolution order the reading of any paper or communication at such time as it shall deem expedient.

ARTICLE XI.

All papers read before the Convention by the members shall be the property and at the option of their authors, unless otherwise disposed of by resolution of the Convention with consent of the authors.

ARTICLE XII.

The President may appoint any member or members of the Convention to read a paper or papers upon any professional subject at any subsequent session.

ARTICLE XIII.

The Convention shall order and determine all matters not herein provided for by resolution.

ARTICLE XIV.

The funds of the Convention shall be held and appropriated by the Treasurer to the discharge of its expenses, and he shall report his accounts to the Convention on the last day of the session, and shall assess a *pro rata* tax upon the members present to defray the same.

ARTICLE XV.

The President shall, on the first day of the session held at the close of his term of office, organize the session, direct the reading of the minutes of the last session, and deliver before the Convention an address upon such subjects as he may deem most useful and important for their consideration.

ARTICLE XVI.

These Articles may be altered and amended in whole or in part, at any session of the Convention by a majority of the votes of the members present.

The foregoing preamble and articles of association were unanimously adopted and signed by eighty-two members present.

The constitution was amended from time to time, as provided for in Article XVI.

At this, the first meeting, upward of eighty dentists became members. The proceedings were interesting and the membership increased so that at the third session, at Boston, in 1857, more than 190 names were on the rolls.

At the second session (New York, 1856), the membership clause in the above constitution was suspended and at a subsequent meeting the whole constitution was abrogated and the convention

made an open one. This was brought about by the fear of "red-tape," which, as previously stated, caused the downfall of the American Society of Dental Surgeons. All questions, even minor ones, were discussed and decided by the membership of the convention, not even referring them to a committee for settlement.

At this meeting a resolution was passed providing for the establishment of "a fund for the promotion of dental science, with especial reference to the employment of some competent person or persons to conduct experiments—physiological, pathological, chemical, and hygienic—as connected with dental science."

This appears to have been the first "overt act" to cause any feeling against the efficiency and value of the Convention. It was said of this resolution, and, it must be confessed with reason:

> Have we become so low as to be mere mechanics, leaving the scientific part of our work to some man or other who does the thinking for us for dollars and cents? There is, then, no further need for study. Henceforth, when the day's operating is done, we may sit in our easy-chair and read novels, knowing that "the man" will send us results when he gets at them.

This was, no doubt, a very severe rebuke to a body assuming any scientific importance or character; but it was certainly deserved.

But this was not the only cause for complaint against the new institution. The character of its proceedings was very severely criticized as being much below the standard demanded by the times. These were eminently progressive in every branch of science, natural and other. Never in the history of our country had it shown so much vitality, such an exuberance of life-force, as then. In the eloquent language of Dr. McQuillen:

> Never at any period was the iconoclastic spirit more rampant than now. The land is strewn with the wrecks of broken idols. Doctrines respectable from the very grayness of their antiquity are rudely hauled up to the bar of popular judgment, and as summarily dispatched. Social and political dogmas that have stood undisturbed for centuries, recognized of all men as true and real, vanish into thin air before the sharp scrutiny of modern inquiry.

In allusion to the report of the proceedings of the third meeting it was said:

> Such an incongruous mixture of sense and nonsense was probably never heard before in any so-called scientific convention. Nothing was said to throw a new light upon any subject under discussion, and no papers were read. The conclusion which must be arrived at by anyone who takes this body of men as a representation of the profession is that we are a set of mere manipulators, but by no means scientific men.

In short, and in effect, the experiment of the Convention was voted, by the best class of dentists, to have been a failure.

> Its day of usefulness is apparently passed; its absurdities censured with just cause; losing the support of its best men, its end seems near at hand.

This prophecy, however, was not true, for the Convention existed until 1875. In this state of affairs it became a necessity that another association should be attempted, and this matter was much agitated in all parts of the country. Various plans of organization were advocated; and, as was proper, the schemes of the two former national societies—the American Society of Dental Surgeons and the American Dental Convention—were thoroughly reviewed. In the latter the effects of absolute latitude in the admission of members were at length glaringly apparent, and it was after many years discovered that the true secret of

failure of these associations lay, not in the fact that they had or had not adopted a system of laws, nor in those laws as such, but in the basis of indiscriminate membership upon which they had been founded. It was finally seen that "the absence of a constitution, laws, or qualifications for membership, partakes of the transient, not the established."

Defects are always plain to the sight; but it is not always so easy to remedy them. A happy solution to the difficulties of forming an association which should be at once stable and yielding; easy of access, yet with exact and firmly held qualifications for membership; having a high scientific aim and character, yet into which the tiro could come and learn of his elders; possessing an organized and authoritative government, which should "derive its just powers from the consent of the governed;" and holding inherent from all these the elements of permanence, popularity, and authority, was at length found in the system of delegation adopted by the American Medical Association.

The following is a list of those who served as officers of the American Dental Convention:

1855—John B. Rich.
1856—Chapin A. Harris.
1857—James Taylor.
1858—Isaiah Forbes.
1859—L. W. Rodgers.
1860—T. L. Buckingham.
1861—John Allen.
1862—A. Westcott.
1863—J. Taft.
1864—W. W. Allport.
1865—H. E. Peebles.
1866—W. B. Hurd.
1867—J. G. Ambler.
1868—J. M. Crowell.
1869—J. G. Ambler.
1870—J. G. Ambler.
1871—William Dutch.
1872—I. J. Wetherbee.
1873—John Allen
1874—B. F. Coy.
1875—B. F. Coy.

The American Dental Association.

Dr. J. H. McQuillen of Philadelphia was the father of the American Dental Association; it was mainly through his advocacy that its organization was effected. His first step in this matter was a letter which he wrote to the profession, signed "Junius," published in the *Dental News Letter,* vol. xii, p. 184. Naturally there was much opposition to the organization of a new society, especially from the members of the American Dental Convention and their adherents.

At a meeting of dentists in New York city in June 1859, among other resolutions on the subject, the following was passed:

> Resolved, That it is the duty of every dentist who desires the advancement of the profession to attend the convention at Niagara Falls and use his influence against any action leading to dissolve the American Dental Convention, or to create any delegated organization.

This was only one of the many evidences of animus from various sources. However, this feeling was not general among the representative men of the profession.

A call for the organization of the new society was generally responded to, and twenty-five delegates from eight local societies and two dental colleges met at Niagara Falls, August 3, 1859, with the idea of organizing a national delegated association. W. W. Allport was chosen chairman, and Jonathan Taft secretary. The following is a list of the delegates and the societies and colleges they represented:

Mississippi Valley Dental Association—S. L. Hamlin, H. McCullum.

Ohio Dental College Association—H. A. Smith, Joseph Richardson, J. T. Toland, J. Taft, G. W. Keely, George Watt, E. Taylor.

Pennsylvania College of Dental Surgeons—William Calvert.

Western Dental Association—D. W. Perkins, W. W. Allport.

Pennsylvania Association of Dental Surgeons—J. H. McQuillen, J. L. Suesserott, T. L. Buckingham, George T. Barker.

Indiana State Dental Association—J. F. Johnston, A. M. Moore, P. G. C. Hunt.

St. Louis Dental Association—H. J. McKellops, I. Forbes.

Pittsburgh Dental Association—W. M. Wright, R. Vandervort.

Cincinnati Dental Association—C. H. James, J. G. Cameron.

Ohio College of Dental Surgery—James Taylor.

Drs. J. H. McQuillen, William M. Wright of Pittsburg, and Joseph Richardson of Cincinnati were appointed a committee to draft a constitution. This committee reported at the next meeting of the association at Washington, July 31, 1860, as follows:

Constitution.

ARTICLE I—NAME.

This organization shall be known by the name of THE AMERICAN DENTAL ASSOCIATION.

ARTICLE II—OBJECTS.

The objects of this Association shall be, to cultivate the science and art of dentistry, and all its collateral branches, to elevate and sustain the professional character of dentists, to promote among them mutual improvement, social intercourse, and good feeling, and to collectively represent and have cognizance of the common interests of the dental profession in every part of the United States.

ARTICLE III—MEMBERS.

SECTION 1. The members of this Association shall be exclusively practitioners of dentistry, holding their appointment to membership either as delegates from local institutions, or as permanent members.

SEC. 2. The delegates shall receive their appointment from permanently organized dental societies and dental colleges in the Union, each delegate holding his appointment for one year.

SEC. 3. Each local society shall be entitled to send to the Association one delegate for every five of its active members, and the faculty of each college to send one of its members as a representative.

SEC. 4. The permanent members shall consist of all those who have served in the capacity of delegates. Each delegate and permanent member shall be entitled to debate and vote on all questions, and be eligible to any office in the gift of the Association.

SEC. 5. To defray the expense of printing the Transactions, and to meet other incidental expenses, the sum of two dollars shall be assessed annually upon all the members present at meetings of the Association. No member who is not present at a meeting of the Association shall be required to pay the annual assessment.

SEC. 6. Each member elect, prior to the permanent organization of the annual meeting, or before voting on any question after the meeting has been organized, must sign these regulations, inscribing his name in full, specifying in what capacity he attends, and, if a delegate, the title of the institution from which he has received his appointment.

SEC. 7. No one shall be permitted to address the Association before giving his name and residence, which shall be distinctly announced from the chair.

ARTICLE IV—MEETINGS.

The regular meetings of the Association shall be held annually, and commence on the last Tuesday in July. The place of meeting shall be determined each year by vote of the Association.

ARTICLE V—OFFICERS.

SECTION 1. The officers of the Association shall be a President, two Vice-presidents, Corresponding Secretary, Recording Secretary, and a Treasurer. Two or more nominees for each office shall be presented by a special committee of one from each delegation, and shall be voted for separately by ballot, a plurality of votes being necessary for an election. Each officer shall hold his appointment for one year, and until another is elected to succeed him.

SEC. 2. The President shall preside at the

meetings, and perform all the duties that custom or parliamentary usage may require.

Sec. 3. The Vice-president. In the absence of the President, one of the Vice-presidents shall assume all the duties of the office; and in the absence of these officers, a chairman *pro tem.* shall be appointed *viva voce.*

Sec. 4. The Corresponding Secretary shall attend to the correspondence with the Association, and give due notice of the time and place of each annual meeting.

Sec. 5. The Recording Secretary shall keep accurate minutes of the proceedings of the Association, preserve the archives and unpublished Transactions, and attend to all other duties that appertain to the office.

ARTICLE VI—Standing Committees.

Section 1. The following Standing Committees shall be organized at every annual meeting, to prepare, arrange, and expedite business for each ensuing year, and to carry into effect the orders of the Association, not otherwise assigned, namely: a Committee of Arrangements, of Publication, on Prize Essays, on Dental Physiology, on Dental Chemistry, on Dental Pathology and Surgery, on Mechanical Dentistry, Dental Education, and Dental Literature.

Sec. 2. The Committee of Arrangements shall be composed of three members, one of whom, if practicable, shall reside in the place at which the Association is to hold its next ensuing annual meeting. They shall be required to procure suitable accommodations for the meeting; to verify and report upon the credentials of membership; to receive and announce all essays and memoirs voluntarily communicated, either by means of the Association or by others through them; and to select and announce, at the earliest period practicable after their appointment, subjects for discussion at the succeeding annual meeting.

Sec. 3. The Committee of Publication shall consist of five members, of which the Corresponding Secretary and Treasurer must constitute a part. They shall be authorized to employ a competent reporter to furnish an accurate report of the proceedings of each meeting. They shall superintend the publication and distribution of such portions of the Transactions as the Association may direct. This Committee shall audit the accounts of the Treasurer, and present a statement of the same in the annual report of the committee, which report shall specify the character and cost of the publications of the Association during the year, the number of copies still at the disposal of the meeting, and the funds on hand for further operations. The committee shall be instructed to print, at the beginning of each volume of the Transactions, the following disclaimer, viz: "The American Dental Association holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when so decided by special resolution."

Sec. 4. The Committee on Prize Essays shall consist of five members. Two prizes, consisting of medals not exceeding in value fifty dollars each, may be awarded to the best two communications reported on favorably by the committee and directed by the Association to be published.

Sec. 5. The Committees on Dental Physiology and Dental Chemistry shall be composed of three members each. It shall be the duty of each committee to present yearly reports in their special departments, embracing, if practicable, the results of original investigations.

Sec. 6. The Committee on Dental Pathology and Surgery, consisting of five members, shall have under consideration everything that appertains to pathological conditions of the teeth and adjacent tissues, and the remedial agencies embraced under the head of operative dentistry. Improvements in the latter department, if expedient, shall be thoroughly tested, and reported on before the Association by this committee.

Sec. 7. The Committee on Mechanical Dentistry shall consist of five members, who shall receive and take cognizance of plans, improvements and specimens in this department, that may be presented by persons desiring to bring them before the Association. The Committee shall be authorized to reject those they may deem unworthy of presentation.

Sec. 8. The Committee on Dental Education and Dental Literature, consisting of three members, shall make annual reports on these important subjects.

The selection of the chairman and members of the different committees shall be referred to the nominating committee.

ARTICLE VII—Amendments.

These articles may be altered and amended with the consent of three-fourths of the members present, at the subsequent annual meeting to that at which such amendment or alteration may have been proposed.

Before this society many papers, clinics and other important matters were

threshed out. It was, indeed, the clearing-house for all matters pertaining to progressive dentistry during its many years of usefulness.

The following is a list of those who ably served the association as presiding officers:

1859—W. W. Allport, Chicago, Ill. (First meeting for organization.)
1860—W. H. Atkinson, Cleveland, Ohio.
1861—(No meeting).
1862—George Watt, Xenia, Ohio.
1863—W. H. Allen, New York, N. Y.
1864—J. H. McQuillen, Philadelphia, Pa.
1865—C. W. Spalding, St. Louis, Mo.
1866—C. P. Fitch, New York, N. Y.
1867—A. Lawrence, Lowell, Mass.
1868—Jonathan Taft, Cincinnati, Ohio.
1869—Homer Judd, St. Louis, Mo. (Owing to a change in the constitution, officers elected at this and the sessions following served at the next annual meeting subsequent to their election.)
1870—W. H. Morgan, Nashville, Tenn.
1871—George H. Cushing, Chicago, Ill.
1872—P. G. C. Hunt, Indianapolis, Ind.
1873—T. L. Buckingham, Philadelphia, Pa.
1874—M. S. Dean, Chicago, Ill.
1875—A. L. Northrop, New York, N. Y.
1876—George W. Keely, Oxford, Ohio.
1877—F. H. Rehwinkel, Chillicothe, Ohio.
1878—H. J. McKellops, St. Louis, Mo.
1879—L. D. Shepard, Boston, Mass.
1880—C. N. Peirce, Philadelphia, Pa.
1881—H. A. Smith, Cincinnati, Ohio.
1882—W. H. Goddard, Louisville, Ky.
1883—E. T. Darby, Philadelphia, Pa.
1884—J. N. Crouse, Chicago, Ill.
1885—W. C. Barrett, Buffalo, N. Y.
1886—W. W. Allport, Chicago, Ill.
1887—Frank Abbott, New York, N. Y.
1888—C. R. Butler, Cleveland, Ohio.
1889—W. M. Foster, Baltimore, Md.
1890—A. W. Harlan, Chicago, Ill.
1891—W. W. Walker, New York, N. Y.
1892—J. D. Patterson, Kansas City, Mo.
1893—(Formal session only, owing to the holding of the World's Columbian Dental Congress; officers elected in 1892 held over until 1894).
1894—J. Y. Crawford, Nashville, Tenn.
1895—J. Y. Crawford, Nashville, Tenn.
1896—James Truman, Philadelphia, Pa.

The National Dental Association.

The above-named society resulted from the fusion of the American Dental Association and the Southern Dental Association, which was originally suggested in 1894 by Dr. B. Holly Smith, president of the Southern Dental Association, in the president's address before the annual meeting of the association. Dr. Thomas Fillebrown was present on this occasion and heartily agreed to President Smith's suggestion, and pledged his support in bringing the union about. There was a great deal of opposition from various sources to be overcome, amongst both the Southern men as well as members of the American Association. Dr. Smith wrote many letters and visited many of the southern cities to break down the opposition. The American Dental Association met at Old Point Comfort, Va., August 7–10, 1894, and during this session Dr. Thomas Fillebrown offered the following resolution, which was adopted:

Whereas, A closer union of the members of the dental profession in the United States is desirable and would promote scientific and professional advancement;

Resolved, That a committee of five be appointed to confer with the Southern Dental Association in regard to the formation of one National Association.

The president appointed as that committee Thomas Fillebrown, chairman; B. Holly Smith, Louis Jack, J. Y. Crawford, and J. N. Crouse.

At the next meeting of the association, at Asbury Park, N. J., August 6–9, 1895, the president, Dr. J. Y. Crawford, in the president's annual address, urged the union of the two associations and reappointed the above-named committee.

The Southern Dental Association met in Atlanta, in October 1895. The fol-

lowing committee was appointed to act for that association, jointly with the committee of the American Dental Association, Drs. L. G. Noel, E. P. Beadles, J. T. Calvert, J. R. Knapp, and Francis Peabody.

At the next meeting of the American Dental Association, at Saratoga Springs, N. Y., August 4–7, 1896, the following report was made by the joint committees and adopted:

SARATOGA, August 5, 1896.

The report of committee from the Southern Dental Association to confer with committee from the American relative to union of the two societies was to the effect that the committee had been unable to come together; and as the result of correspondence it was advised that an effort be made to have both societies hold their next meeting at the same time and place, that the committees might confer and the association dispose of the matter finally.

The association voted to offer the following suggestion to the committees, with instructions to make a final report to this society at its next meeting. It would meet the approval of the Southern Dental Association if the American would meet at Old Point Comfort the first Tuesday in August, 1897, the same time and place that the Southern convenes.

Committee from the Southern Dental Association:

L. G. NOEL,
E. P. BEADLES,
J. T. CALVERT,
J. ROLLO KNAPP,
FRANCIS PEABODY.
By S. W. FOSTER, *Secretary.*

Your committee recommend the acceptance of the suggestion of the Southern Dental Association as to place of meeting, and also that the committee of the American Dental Association be continued another year.

THOMAS FILLEBROWN,
J. N. CROUSE,
J. Y. CRAWFORD,
B. HOLLY SMITH.

The American Dental Association and the Southern Dental Association both held their annual session at Old Point Comfort, Va., August 3, 1897. The American Dental Association committee reported as follows:

Your committee appointed to promote the union of the American Dental Association with the Southern Dental Association have attended to their duty, and beg leave to make the following report:

The union of the two associations seems to them a desirable object to be attained. They have held several meetings in conference with the committee of the Southern Association, and have agreed upon the following points in common, to incorporate in their reports:

They desire to favorably recommend the union of the associations upon the following basis:

First: Providing a new association, with a new name.

Second: Assuring membership in the new association of all the present members of the Southern and American Associations.

Third: Providing for organization of branches in the several divisions, to be formed by the members residing in that division. One of these divisions would be composed of the Southern Association, thus preserving its organization and its history.

Fourth: That the meetings shall be held in each division in rotation.

Fifth: That the president shall be chosen from the section in which the meeting is being held.

The committee recommend that this association meet in convention at some convenient time, to consider the subject of union.

THOMAS FILLEBROWN,
B. HOLLY SMITH,
J. Y. CRAWFORD,
J. N. CROUSE.

The following was adopted:

Moved, That the Committee on Union be requested to arrange for a convention of the members of the two associations to consider this subject.

August 5, 1897, the members of the American and Southern Dental Associations met in the Hygeia Hotel at Old Point Comfort.

Dr. Thomas Fillebrown, chairman of the Committee on Union of the American Dental Association, called the convention to order. Dr. John B. Rich, of Washington, was chosen chairman, and Drs. W. E. Walker and Geo. H. Cushing, secretaries.

Dr. J. D. Patterson introduced the following resolution, which was adopted:

Resolved, That the members of the American Dental Association and the members of the Southern Dental Association do hereby organize themselves into a body to be known as and styled "The National Dental Association."

Thus the National Dental Association was organized, and the following officers elected for the ensuing year:

President—Thomas Fillebrown, Boston.

Vice-president for the East—James McManus, Hartford, Conn.

Vice-president for the West—L. L. Dunbar, San Francisco.

Vice-president for the South—B. Holly Smith, Baltimore.

Recording Secretary—Geo. H. Cushing, Chicago.

Assistant Secretary—W. E. Walker, Pass Christian, Miss.

Corresponding Secretary—Emma Eames Chase, St. Louis.

Treasurer—Henry W. Morgan, Nashville.

Executive Committee—L. G. Noel, M. F. Finley, George Eubank, J. N. Crouse, W. P. Dickinson, J. D. Patterson, C. N. Pierce, H. A. Smith, and V. H. Jackson.

The following constitution and by-laws were adopted:

Constitution and Rules of Order of the National Dental Association.

Preamble.

We, the members of the American Dental Association and of the Southern Dental Association, do declare ourselves a society to cultivate the science of dentistry, and have adopted the following constitution and rules of order for our government:

Constitution.

ARTICLE I—Name.

The object of this Association shall be to cultivate the science and art of dentistry and all its collateral branches, to elevate and sustain the professional character of dentists, to promote among them mutual improvement, social intercourse, and good feeling, and collectively to represent and have cognizance of the common interests of the dental profession.

ARTICLE III—Members to be of Three Classes.

Section 1. The members of this Association shall be of three classes, viz, permanent, delegate, and honorary members; the two former classes having equal rights and privileges except that none but permanent members shall be eligible to office.

Sec. 2. Permanent members shall consist of those who, coming as delegates and complying with the requirements of the Association, shall sign a statement in a book to be kept for that purpose signifying to the Treasurer a desire for permanent membership.

Sec. 3. All delegate members shall be practitioners of dentistry. They shall be received only from permanently organized state dental societies. They shall be elected by ballot at some regular meeting of their society, and shall be members who have done some meritorious work for the profession; but no person shall be received as a delegate who is in arrears for dues to this Association.

Sec. 4. Honorary members shall consist of prominent worthy members of the dental profession in foreign countries, who shall be elected by ballot.

Sec. 5. It is hereby specially provided that all persons at present permanent members of the American Dental Association and of the Southern Dental Association are permanent members of this Association, and entitled to all the privileges of the class to which they belonged, without further action, and the Treasurer is hereby directed to transcribe their names upon the roll of membership of this Association.

ARTICLE IV.—Delegates from State Societies.

Section. 1. Each state society may send one for every ten of its active members as delegates to this Association for one year, upon complying with the requirements of its constitution; but no society shall be entitled to representation that does not adopt or substantially recognize the code of ethics of this Association.

SEC. 2. Each delegate shall present credentials which shall be approved by the Executive Committee.

SEC. 3. If the Committee on Credentials has knowledge that any applicant for membership is violating the code of ethics, said applicant shall not be received, but shall be referred by the committee to the societies whose delegates they are; and in no case shall this Association be compelled to treat with violations of the code except the violator is a member of this body and has no membership in any local body.

SEC. 4. This Association will receive no delegates who, since August 1875, shall have entered the profession without having first graduated at some reputable dental or medical college.

ARTICLE V—SIGNING CONSTITUTION.

SECTION 1. Each new member, before voting or speaking on any subject before the meeting, shall sign this constitution, inscribing his name and the title of the society from which he receives his appointment.

SEC. 2. *Dues.* The annual dues for membership in this Association shall be five dollars.

SEC. 3. *Dues to be paid.* No member is eligible to office, nor can he speak or vote in this association or in any of its branches, until his annual dues are paid.

SEC. 4. If the dues of any member remain unpaid for two years his name shall be erased from the list of members of this Association.

SEC. 5. *Conduct of members.* Any act of special immorality or unprofessional conduct committed by a member of this Association shall be referred to the Executive Committee, whose duty it shall be to thoroughly examine into the case, and if the charges be sustained to report at the next meeting of the annual session at which the charges are preferred. Whereupon, by a vote, the offending member may be reprimanded or expelled, a two-thirds vote being required for expulsion, a majority being sufficient for reprimand.

SEC. 6. *Expelled members.* Any member of this Association being expelled or suspended from his local society shall from that date cease to be a member of this body.

SEC. 7. *Resignation of members.* Any member not in arrears may offer his resignation, upon the acceptance of which his membership shall cease, but the Association may at any time thereafter reinstate such member by unanimous consent.

ARTICLE VI—OFFICERS.

SECTION 1. The officers of this Association shall be a President, three Vice-presidents, Corresponding Secretary, Recording Secretary, Treasurer, and an Executive Committee consisting of nine members.

SEC. 2. *Term of office.* Each officer, except as otherwise provided, shall hold his appointment for one year, or until another is elected and qualified to succeed him.

SEC. 3. *Election of officers.* The President, Vice-presidents, Corresponding Secretary, Recording Secretary, Treasurer, and members of the Executive Committee shall be elected by ballot in open session of the Association. The members of the Executive Committee shall be chosen from each division.

After 1897 the President shall be chosen from the division in which the meeting is being held.

SEC. 4. One of the Vice-presidents shall be chosen from each section, namely, one from the East, one from the West, and one from the South, and shall rank by seniority.

SEC. 5. The candidates for President and Vice-presidents shall be nominated by an informal ballot of the Association. The three names, or, in case of a tie, the four names, having the greatest number of votes shall be the sole nominees.

A formal ballot shall then be taken, in which a majority of the ballots cast shall be necessary to a choice.

The informal ballot may be made formal by a three-fourths vote of the members present.

ARTICLE VII—DUTIES OF OFFICERS.

SECTION 1. *Duties of President.* The President shall preside according to parliamentary usage as laid down in "Robert's Rules of Order" and the rules of order adopted by this Association, and shall present an annual address.

SEC. 2. *Duties of Vice-presidents.* In the absence of the President, one of the Vice-presidents shall perform the duties of the office, and in the absence of these officers a chairman *pro tem.* shall be appointed by the Executive Committee.

SEC. 3. *Duties of Corresponding Secretary.* The Corresponding Secretary shall attend to the correspondence of the Association with the societies therein represented, and with other scientific bodies as may be desirable.

SEC. 4. *Duties of Recording Secretary.* The Recording Secretary shall keep accurate

minutes of the proceedings of the Association, preserve the archives and unpublished documents, and attend to the other duties that pertain to his office. He shall be *ex-officio* chairman of the Publication Committee, and shall see that due notice is given of the time and place of the meetings of the Association.

SEC. 5. *Duties of Treasurer.* The Treasurer shall hold all the moneys belonging to the Association, and shall keep an accurate account as between the Association and its members. He shall furnish bonds satisfactory to the Executive Committee. He shall attend the meeting of the Executive Committee at 8 A.M. on the day of the annual meeting to receive dues, and shall attend at roll-call to verify the list of names, checking all such as are in arrears for dues; he shall restore such names upon payment of dues within the legal limits, and shall notify all whose names may be erased from the list of membership. He shall pay the drafts of the Secretary, countersigned by the President, and shall report to the Executive Committee, where his accounts shall be audited and by whom his report shall be presented to the Association, together with their own.

SEC. 6. All resolutions appropriating money, except for the legitimate expenses of this Association, shall require a two-thirds vote of all the members present.

ARTICLE VIII—EXECUTIVE COMMITTEE.

SECTION 1. The Executive Committee shall consist of nine members, and shall be the business committee of the Association, to whom shall be referred all business not otherwise specially provided for. They shall report at each meeting, under the proper head, their doings for the current year.

SEC. 2. *Classification of Executive Committee.* At the first election of the Executive Committee the first three shall be elected to serve three years, the second three for two years, and the last three for one year, and thenceforward three new members shall be elected each year by ballot, one from each division, to serve three years, and in case of the absence of any member of this committee his place may be temporarily filled by the remaining members of the committees.

SEC. 3. *Subdivision of Executive Committee.* The Executive Committee shall meet after the election of new members to choose their own chairman and secretary, and to divide themselves into sub-committees of three each, as follows, and for the purposes described:

SEC. 4. *First Division: Committee of Arrangements.* The first division of this committee shall act as the Committee of Arrangements, and shall make suitable preparations for the meetings of the Association, of which they shall have the charge. These three shall provide a book for the registration of members or visitors as they arrive, with the place of their residence and hotel address, and shall attend to the general wants of the Association during its session: and it shall be their further duty to secure from the Treasurer a good and sufficient bond.

SEC. 5. *Second Division: Credentials and Auditing Committee.* The second division shall examine and verify the credentials and qualifications of members, including all violations of the code of ethics and the constitution, and shall also be the auditing committee for that year.

SEC. 6. *Third Division: Committee on Volunteer Essays.* The third division shall examine all volunteer essays, and before they are read to the Association shall give their approval, in order that time may not be taken up by unworthy or irrelevant matter. They shall report names of places for the next meeting of the Association.

SEC. 7. *Reports of Sub-committees.* Each of these sub-committees shall report from time to time, as may be necessary, to the Executive Committee as a whole, who shall decide upon such report, if possible; but in case of their inability to decide upon any matter, it shall be brought before the Association for its decision as early as practicable.

SEC. 8. *Meetings of Executive Committee.* The Executive Committee shall, if possible, meet for consultation and arrangement of their respective duties on the day preceding the annual session of the Association, and shall meet for the examination of credentials and the reception of papers, and such other business as may properly come before them, at 8 A.M. on the first day of the annual meeting.

SEC. 9. *Chairman may convene the committee.* The chairman of the Executive Committee may at his own discretion summon the members thereof to a meeting at any suitable hour during the sessions of the Association, and at any other time at the request of five members of the committee.

ARTICLE IX—LOCAL COMMITTEE OF ARRANGEMENTS.

SECTION 1. There shall be appointed by the President annually a committee of three residing at or near the place selected for the next meeting, whose duty it shall be to assist the Executive Committee to procure rooms for meetings, and make such other

local arrangements as may be needed for the Association.

SEC. 2. *Publication Committee, how appointed.* The President shall appoint two members of this Association who shall act in conjunction with the Recording Secretary as the Publication Committee. The committee shall be authorized to employ a competent reporter to furnish an accurate report of the proceedings of each meeting.

SEC. 3. *Instructions to the Publication Committee.* The Publication Committee shall superintend the publication and distribution of such portions of the Transactions as the Association may direct, or the committee judge to be of sufficient value. They shall specify in the annual report of this committee the character and cost of the publications of the Association during the year, and the number of copies still on hand.

SEC. 4. Any report or other paper, to be entitled to publication in the volume of the Transactions for the year in which it shall be presented to the Association, must be placed in the hands of the Publication Committee within twenty days after the close of the annual session, and must also be so prepared that the proof-sheets furnished the authors shall be returned to the committee without material alteration or addition.

SEC. 5. Every paper received by this Association, and all plates or other means of illustration, shall be considered the exclusive property of the Association, and shall be published for its benefit.

SEC. 6. *Disclaimer.* The Publication Committee is hereby instructed to print at the beginning of each volume of the Transactions the following disclaimer, viz: "The National Dental Association, although formally accepting and publishing the reports of the various sections and the essays read before the Association, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution."

ARTICLE X—QUORUM.

Fifteen members shall constitute a quorum for the transaction of business in this Association.

ARTICLE XI—SUSPENSION OF RULES: THREE-FOURTHS VOTE.

The regular order of business may be temporarily suspended by a three-fourths vote of all members present, for the consideration of a specific subject, upon the completion of which the regular order shall be at once resumed.

ARTICLE XII—TIME AND PLACE OF MEETINGS.

SECTION 1. The regular meetings of this Association shall be held annually on the first Tuesday after the last Saturday in August, or at such time as shall be determined by ballot of the association.

SEC. 2. The place of meeting shall be determined each year by vote of the Association, except that the place of meeting shall be in the West in 1898, in the East in 1899, and in the South in 1900, and thereafter in the order named, meeting in each section every third year.

SEC. 3. For the purpose of this Association, the United States shall be divided into three divisions, to be called The East, The South, and The West.

The East shall include New England, New York, New Jersey, Pennsylvania, Ohio, Indiana, lower peninsula of Michigan, and Ontario.

The South shall include Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Kentucky, Tennessee, Arkansas, Oklahoma, and Indian Territory.

The West shall include Illinois, Missouri, Wisconsin, upper peninsula of Michigan, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Idaho, Utah, Washington, Oregon, Nevada, California, Arizona, New Mexico, and Alaska.

ARTICLE XIII—ORGANIZATION OF SECTIONS.

SECTION 1. This association shall be divided into ten sections, as follows:

I. Prosthetic Dentistry, Metallurgy, and Chemistry, including Crown and Bridge Work.
II. Dental Education, Literature, and Nomenclature.
III. Operative Dentistry.
IV. Histology and Microscopy.
V. Materia Medica and Therapeutics.
VI. Physiology and Etiology.
VII. Anatomy, Pathology, and Surgery.
VIII. Hygiene and Prophylactic Dentistry.
IX. Orthodontia.
X. Clinics.

SEC. 2. It shall be the duty of each member to identify himself with one or more of the above-named sections, and he shall inform the recording secretary of his choice at the time of joining the Association. At the close of the morning session of the second day of

the annual meeting, the roll of permanent members in good standing shall be called for the annual reorganization of the sections.

SEC. 3. The Secretary shall assign members to the sections in which they are expected to work if they shall fail to make their own choice.

SEC. 4. It shall be the duty of the Recording Secretary, immediately at the close of the morning session of the second day, to present lists of the names of each section, as a basis for the organization of the sections.

SEC. 5. The officers of each section shall be a chairman and secretary, who shall be appointed by the President upon nomination by the Executive Committee, and shall be members known to be capable and interested in the performance of the duties of the offices.

SEC. 6. The chairman of each section shall preside at all of its meetings, shall exercise general supervision over the business, and shall see that the labors of his section are conducted in the manner calculated to secure the best results. The chairman, and such other member or members as the section shall select, shall prepare and read at the annual meeting of the past year in the branches included in the section. The reading of such papers shall not together occupy more than forty minutes.

SEC. 7. The several sections shall meet at 10 A.M. on the morning of the first day of the annual meeting of the Association.

SEC. 8. For the information of all members a list of the members of each section shall be published in the Transactions of each year.

SEC. 9. The reports of the sections shall be called by the President in consecutive order, beginning each succeeding year one number higher than on the preceding year, and no section having been called and passed shall be again heard until all others have been called.

ARTICLE XIV—BRANCHES.

SECTION 1. For the wider diffusion of the benefits of this Association the members of each division may form themselves into one or more separate bodies, to be styled "Branches."

SEC. 2. *Power and Obligations.* Branches shall have such powers and privileges and be subject to such obligations, as shall be determined upon from time to time by the National Association in annual meeting.

SEC. 3. *Government.* Each branch shall be free to hold meetings and to govern itself as its members shall think fit, but no branch law shall be valid which, in the opinion of the National Association, may contravene any fundamental law of the association.

SEC. 4. *Expenses.* Each branch shall pay its own expenses, and no branch shall be deemed for any purpose the agent of the Association, or have power to incur any obligation in its behalf.

SEC. 5. *Proceedings.* Each branch shall furnish a copy of its proceedings, including papers and discussions, for publication with the Transactions of the National Association.

SEC. 6. *Delegates.* Each branch may receive delegates from societies within its division upon the same condition as the National Association, and which shall have the same standing in the National Association as though admitted directly from the state societies.

SEC. 7. *Dues.* The annual dues of members attending the branches shall be paid to the branch treasurer. Two-fifths of the dues may be retained for the benefit of the branch. The remaining three-fifths shall be paid over to the Treasurer of the National Association.

SEC. 8. The annual meeting of any branch shall be omitted whenever the annual session of the National Association shall be held in its division.

RULES OF ORDER.

1. On the arrival of the hour of meeting the President shall take the chair, call to order, and announce that the meeting is open for business.

2. No motion or speech shall be in order until the mover or speaker shall have been recognized and assigned the floor by the chair, nor shall a motion be open for debate until seconded and stated by the chair.

3. No one shall be permitted to address the Association before giving his name and residence, which shall be distinctly announced from the chair, nor shall he speak more than twice, nor longer than fifteen minutes in all, unless by consent of the Association.

4. At the request of any member a motion shall be put in writing.

5. At the request of five members a question shall be divided, or the yeas and nays ordered.

6. When a question is under debate no other motion shall be in order, except, first, to adjourn; second to lay on the table; third, the previous question; fourth, to postpone; fifth, to commit; sixth, to amend; and these motions shall take precedence in the order here stated.

7. The previous question, and the motions to adjourn, to lay on the table, and to postpone shall be decided without debate.

8. A motion to adjourn shall always be in order, but no member can make such a motion while another is speaking or while a vote or ballot is being taken.

9. A second amendment to the main question shall not be in order until the first is disposed of, nor shall there be an amendment of an amendment to an amendment.

10. After a motion has been seconded and stated by the chair, it shall not be withdrawn without the consent of the Association.

11. No member shall interrupt another while speaking, except to raise a point of order.

12. When called to order, a member shall sit down until the point of order is decided by the chair, or, in case of appeal, by the Association. If the point of order be sustained, the member can proceed in order by the consent of the Association.

13. Every member shall vote upon a question unless excused by the Association.

14. When any motion, except to adjourn, has been rejected, it shall not be renewed without unanimous consent.

15. Any member, who on a question voted in the majority, may move a reconsideration of that question; but if that motion shall be lost or laid upon the table, it shall not be renewed without unanimous consent.

16. The president may vote with the members upon all questions, but having so voted shall not give the casting vote in case of a tie.

17. Motions for filling blanks shall be put in the order in which they are moved.

18. On a division, or in voting by yeas and nays any member may change his vote before the result is declared.

19. These rules may be suspended by unanimous consent.

The following have served the National Dental Association as president:

1898—Thomas Fillebrown, Boston, Mass.
1899—H. J. Burkhart, Batavia, N. Y.
1900—B. Holly Smith, Baltimore, Md.
1901—G. V. Black, Chicago, Ill.
1902—J. A. Libbey, Pittsburgh, Pa.
1903—L. G. Noel, Nashville, Tenn.
1904—Charles C. Chittenden, Madison, Wis.
1905—W. E. Boardman, Boston, Mass.
1906—Mark F. Finley, Washington, D. C.
1907—A. H. Peck, Chicago, Ill.
1908—William Carr, New York, N. Y.

The foregoing is in brief the result accomplished in the organization of the National Dental Associations in the United States. Many men not mentioned in this sketch deserved credit for the great work they did in aiding and supporting those who took the initiative in making possible the perfecting of these organizations. These organizers compare with those to whom Robert Louis Stevenson refers: "They were not colonists, but pilgrims. They traveled towards wine and gold and sunshine, but their hearts were set on something higher."

After the reading of Dr. Thorpe's paper the meeting adjourned until Wednesday morning.

SECOND DAY—Wednesday, May 13th.

The meeting was called to order Wednesday morning, May 13th, at 9.30 o'clock, by the president, Dr. Melendy.

The secretary, Dr. Frink, read the minutes of the previous meetings, which were approved as read; after which the President announced as the next order of business the reading of a paper by Dr. L. F. Luckie, Birmingham, Ala., on "Oral Surgery," as follows:

Oral Surgery.

By L. F. LUCKIE.

The object of this paper is to create a keener interest on the part of the profession in oral surgery. Too long this branch of our profession has been neglected. Of course every operation performed in the mouth is a surgical operation. Whenever we repair a decayed tooth or lance an abscess we perform a surgical operation, just as much so as any minor operation performed by the general practitioner. The difference in the two is that one is done by the dentist in the mouth, is more difficult to perform, consumes more time, the fee is less, and in abscess cases the operation is often done gratis. The physician would receive from five to ten dollars for opening and dressing an abscess. But generally we mean a different class of operations when we speak of oral surgery—operations such as cleft palate, fractured maxillæ, removal of necrosed bone—operations which the dentist does not as a rule perform. I believe that the dentist is the proper one to do these operations, because he takes into consideration the value of teeth to the individual; then, too, he operates in the mouth, and if a tumor or any incision has to be made he confines the operation as much as possible to the oral cavity, leaving no scar on the outside to mar the facial contour of the individual. To illustrate what I mean by a scar on the face: At our college clinic a young lady presented herself for examination whose face on one side was comely; the other was marked by a horrible scar. She reported that she had had an abscess and that it had been lanced four times by a physician, healing up each time and then breaking out again. An examination revealed a piece of root of the upper second molar in the socket. This was removed and the patient reported after several weeks, and no further trouble was experienced. Had the dentist who sent her to the physician had some knowledge of diag-

nosis, and the physician some knowledge of the oral cavity, the young lady's face would never have been marred by a scar. Such ignorance on the part of either was inexcusable.

Of course I do not mean to say that every dentist should perform these operations any more than the general practitioner of medicine should make a specialty of ear, nose, and throat. But I do say that we should specialize in that line as much as the medical profession does in ear, nose and throat. I also say that the dentist should have a thorough knowledge of oral surgery so as to be able to diagnose cases and instruct the patient in regard to consulting an oral surgeon, and, in emergency cases, operate. Lives have been and are still being sacrificed by a lack of this knowledge. To illustrate: A dentist was treating a young man for alveolar abscess and found it impossible to control the abscess. He noticed that a sac had begun to form on the side of the neck below the angle of the mandible, and stated that he did not want to extract the tooth because the tissue was so inflamed. The infection began to spread and the sac grew larger. The dentist called in a physician, and nothing was done for the boy. A dentist from another city who happened to be visiting the place was called in consultation and asked to extract the tooth. He did so after it having been agreed that the physician and home dentist would assume the responsibility. The pus, of course, could not be drained through the socket, and the boy died the next morning—not because of the extraction, but because of ignorant diagnosis and lack of proper operative procedure and prognosis on the part of physician and dentist.

Another young man had a cleft palate. Two operations were performed by a physician and both proved unsuccessful, the stitches pulling out. Had this operation been done by a dental surgeon an appliance would have been placed so the stitches could not pull out.

I have talked to a great many dentists on the subject of oral surgery. Some said that they had not had sufficient instruction or clinical experience in oral surgery to perform these operations. Others that they did not have time to perform the operations, as they would lose time from their dental work and thereby lose money. Others, that they were not prepared to do the work, as they did not have the instruments and the means of sterilizing and anesthetizing. Some said that they did not like that kind of work. I am inclined to think the first reason is the correct one. We are not taught sufficient oral surgery in our colleges and the clinical experience is not furnished to make us competent in this line. However, we owe it to our patients to read and study the subject and become as proficient as possible. I think the loss of money a poor excuse, for the oral surgeon would make in one operation a fee which would be more than he could make in a whole day repairing teeth.

I could name many other cases where much damage has been done both by the M.D. and the D.D.S. through lack of understanding the subject of oral surgery; however, I did not intend to write a long paper, but merely to state a few ideas on the subject and report a few cases, that some interest might be aroused in this great specialty.

In conclusion, let me suggest to those connected with dental colleges that they strive to have this subject introduced into the curriculum in a broader sense, so that the future practitioner may be

able to diagnose conditions and instruct the patient as to what is the best course to pursue. And let me urge the members of this association to read a work on oral surgery or take a postgraduate course that they may also obtain this knowledge.

Discussion.

Dr. S. W. Foster, Atlanta, Ga. It has been a great pleasure to me to listen to a paper on oral surgery. I wish that it could be proclaimed from the housetops so that every dentist throughout this whole broad land would be duly impressed with the importance of oral surgery for the dentist. The dental profession has always been afraid of oral surgery and looked upon it as something unusually out of their way, and it is chiefly for that reason that the legislation pending before Congress relative to dental surgery in the army and navy has been defeated. The dental profession has not devoted enough attention to this department of its work. The dentist is too eager to engage the assistance of the practicing physician whenever anything presents itself that does not directly bear upon the dental organs. From the standpoint of the law we have as much right to administer anesthetics as the physician. Our license invests us with as much authority as the medical practitioner possesses to perform any operation of the face and mouth. We certainly should have as much technical training, and if the dental profession should realize the importance of this work it would be to its advantage. As the essayist has said, false diagnoses are frequently made by the medical as well as the dental practitioner, and the principal fault lies within our colleges. The majority of colleges do not impart to their students sufficient technical training in oral surgery. The student goes away from school feeling that he has not received the necessary technical training, and when he must use the knife he feels that he is going into something unusual and that he is risking his reputation. Nothing is simpler than the treatment of a fractured maxillary bone, or the removal of a necrosed section of it, yet we find the dentist becoming nervous when such a case presents itself. Gentlemen, we must be prepared to do this work as well as the medical practitioner; we owe it to our profession and to our patients that we do not hesitate, but be aggressive. The essayist, who is connected with a college clinic, has made more observations in oral surgery than the average practitioner. He cites a case of cleft palate in which two operations were unsuccessfully performed by a physician. Many men in the dental profession have enough technical knowledge to perform this operation. The dentist should understand the technique of this operation, for he is really in a position to do this operation more satisfactorily than the medical practitioner. Why should he, therefore, dodge these propositions when they present themselves? If you have to treat a fracture or necrosis of the maxillary bone, or a cleft palate, don't refer the case to some medical practitioner! We must assert our rights as dentists and assume the position in the field of oral surgery that belongs to us.

Dr. A. J. Cottrell, Knoxville, Tenn. Without going into a lengthy discussion of the subject, I wish to make a plea for a little good common sense in regard to the realization of the serious results of neglected oral diseases. As our president, perhaps, knows, we have within the last few months lost two of our foremost

citizens in Knoxville owing to alveolar abscess. The laity and the average dentist are under the common impression that an alveolar abscess is a simple matter, and that without treatment it will gradually heal; but frequently such neglected conditions result in the death of the patient. I therefore would appeal to you to be observant and careful, and to appreciate the extreme danger of neglected oral diseases. A short time ago a patient was referred to me by a Nashville dentist; his jaw was swollen, as if he had mumps. The condition had existed for about two weeks. Being very busy at that time, and realizing the seriousness of the patient's condition, I telephoned to a local physician, who had had experience in oral surgery, although the case did not call for any particular amount of skill and experience. This patient had been in the hands of a dentist for three or four weeks, and it had never occurred to him that a special operation was imperative. The physician who removed the necrosed bone told me that within a week or ten days the patient would have succumbed.

Every simple case of alveolar abscess in the maxillæ must be carefully observed and treated, before it assumes dangerous proportions.

Dr. F. A. Johnston, Sheffield, Ala. I, too, wish to make a plea for a more thorough knowledge of this subject on the part of the dentist. The first speaker showed that the operation for cleft palate belongs to the dentist, it being an operation within the mouth. To the dental profession also belongs the honor of having brought this operation to its present point of perfection. In many cases the general surgeon operates for cleft palate and hare-lip, but although the lip closes there is no closure of the palate. The operation may look well after being completed, but in a few years, owing to the cutting off of indispensable tissue the patient appears as if he had received a severe blow in the mouth. All of us have seen patients whose upper lip is hanging inside the lower as the result of a faulty operation of this kind. Only two years ago I saw an operation for the closure of hare-lip, which was performed by two prominent surgeons; the father of the child told me that when the bandage was first taken off, the wires used in the lip had cut through and dropped, making a complete failure of the operation. The fault in this operation lay in the lack of proper knowledge. With few exceptions, all those who have made a specialty of this work and have been successful have been dentists. The dentist's knowledge of the parts involved fits him for performing this operation as no one else can do it. The operator must be familiar with the functions of the teeth and of the muscles involved in order to properly preserve all of these parts. The literature on this subject proves that it has been the dentist who has brought this operation to its present state of perfection. Drs. Brophy, Brown, Garretson, and others before them have done pioneer work in this field. Dr. Brophy has recently demonstrated the reasons for the width of the cleft in patients afflicted in this way, and how the cleft affects the occlusion of the teeth. It certainly behooves the dentists to sufficiently inform themselves in order to intelligently direct such patients. Three years ago a dentist presented a patient with single hare-lip to our association for examination. He had never been instructed in this subject and wanted to know someone to whom he could refer the patient for this operation. This oc-

curred only three or four years ago. At the same meeting a case was cited in which the surgeon had made an external incision in order to wire a fractured mandible. The absurdity of making an external incision in a man's face to set a fractured bone must be apparent to all of you. It has been demonstrated within recent years that the entire mandible can be removed without an external incision, and this is the only proper method for this operation. There is no excuse for making external incisions for the removal of a small piece of bone; the dentist should be equipped to perform this operation himself, or should at least be able to intelligently direct a patient.

Dr. Wm. A. Lovett, Brewton, Ala. I have been very much interested in the essayist's paper and also in Dr. Foster's remarks. In handling cases of oral surgery, we should remember that the dental surgeon has duties both toward his patient and toward himself; to his patient in that the latter is entitled to the very best surgical skill at the command of our profession, and to himself in that, owing to the fact that the dental surgeon is generally not looked upon by the laity and by some members of the medical profession as being competent to perform heroic surgical operations, he must take such precautions as may be necessary to protect himself from adverse criticism. It is for these reasons that I personally never object to having in consultation in such a case any physician whom the family may desire.

As an illustration, permit me to cite a case of my own practice, since mention has been made of the dangers of dento-alveolar abscesses: One of our most prominent citizens presented himself some weeks ago with an incipient dento-alveolar abscess, and I followed the usual operative procedure of aborting the abscess, but to no avail, the relief was only temporary. The busy patient did not return at the appointed time and the abscess recurred with greater intensity. I was called to his home three times for the purpose of giving relief, and there being considerable inflammation, my patient insisted on waiting until the inflammation had subsided, especially after I had again rendered relief. At the fourth visit I extracted the tooth. In the beginning I had prescribed—

℞—Potassium iodid, ʒ ijss;
Sodium chlorid, ʒ iss;
Comp. syr. sarsaparillæ, q. s. ℥ ij.
Sig.—One dram every four hours in water.

I shall not take time to outline my full course of treatment, but would say that since the family physician had been called to administer an opiate, I consulted with him and asked if he could suggest anything. He stated that my treatment was correct, and that he could suggest nothing else. The inflammation, however, increased instead of decreasing after the extraction. Before operating all instruments were sterilized, the cavity was washed with hydrogen dioxid and pure phenol applied on a pledget of cotton. At one time the inflammation seemed to yield to the application of lead-water and opium, but later a diffused cellulitis of the non-suppurative type appeared. The patient having a son in the Tulane University medical school, consulted me as to the advisability of his going to New Orleans for examination and treatment. To this the family physician objected, for the reason that we would "get the little end of the deal, and the public would think us incompetent.". My reply was: "I feel that Mr. —— is entitled to the very

best services that can be rendered. I have done all I know to relieve his condition, and you say you know of nothing else that you could suggest. If grave results should follow, I should be sorry for my refusal to have the patient consult whom he may desire, and you may be assured that the public would condemn us more than we would condemn ourselves." It is but proper to say that my diagnosis and treatment were fully confirmed, and that the New Orleans physicians returned the patient to me, stating that the inflammation would gradually subside under the treatment I was giving, which it did, much to my gratification. The patient and his family appreciated the position which I took in this matter.

The profession of dentistry must establish its own position in the field of oral surgery by demonstrating its ability to occupy such a place. When the public is educated up to the point of looking upon the dental surgeon as a specialist in oral surgery, we may be sure that it will seek our services. As it is, we are regarded as mechanics principally, and in conversing with your patients you may find how surprised they are that in the prescribed college course we are required to study the anatomy of the whole body, and to take many of the branches of general medicine. Every dental surgeon should do his part in educating the masses, and should be prepared to handle any case that he might be called upon to treat.

Dr. P. D. Houston, Lewisburg, Tenn. This subject is of vital importance to me for the reason that I have several patients with abscesses of a few years' standing. I have been treating them for some time, but the abscesses do not entirely yield to my treatment. I wish Dr. Cottrell had told us what to do in such cases. He said we should notice them very carefully, but he has not told us how to remedy them. I came here from Tennessee chiefly in order to learn what the members of the association have to say on the subject of dental surgery, and especially on the subject of abscesses. Dr. Cottrell rather frightened me when he said that two of the foremost citizens of Knoxville have died from alveolar abscess. I hope very much to gain some knowledge on this subject, which is very important for me.

In our state a few years ago a dentist did what he called "sponge-grafting." He opened up the gum tissue down to the alveolus, scraped all the necrosed tissue off the end of the root and when necessary amputated the end of the root. He then sterilized the wound and inserted a sterilized sponge into the opening. The cases treated in this way seemed to heal up successfully. I wish to know if this is the only way of treating such cases or whether there is a better method.

Dr. C. H. Frink, Fernandina, Fla. I very much enjoyed the remarks of the last speaker, I think he has voiced our own sentiments. Ever since the association has been called to order, the discussion has concerned the incapability of the dentist and the necessity that in oral surgical operations he should call in the M.D., or be an M.D. himself. If the M.D. degree will enable the D.D.S. to better treat dental diseases, then, instead of acting upon the suggestion of the gentleman who yesterday expressed his hope that in the course of time every man would have the M.D. degree before being allowed to practice, why not incorporate these necessary branches in the dental degree? I do not think that this gentleman will live to see the day

when all dental graduates will have the degree of M.D., but I should like to see the day when the course that leads to the D.D.S. degree will carry with it everything that we need. I wish to see the day when the dental degree will be so highly thought of that at a meeting of the Southern Branch of the National Medical Association in Birmingham—if it so happened—some prominent member might reverse the tables and express his hopes of seeing the day when all doctors of medicine shall be required to secure the degree of D.D.S. before being allowed to practice medicine. And why should it not be so? Of course, I do not mean to give the impression that I seriously consider for one moment that this is needed, but I would simply indicate the esteem in which the dental degree might be held if it were all that it should be and all that we desire it to be.

If the fault lies with our college curriculum, let us do everything to raise the course to the required standard, but why should a man have to attend two colleges? Some men have properly suggested that ours should have been the M.D. degree, and that the dentist should have been the specialist of medicine, but we now have the separate degree of D.D.S. conferred by separate and distinct schools, and it would be hard to change this old order of things.

Another point mentioned was the advisability of the dentist calling in the physician to assist in the administration of nitrous oxid. This should never be done. If we are not sufficiently educated to individually administer general anesthetics, let us perfect ourselves, let us study, let us take a postgraduate course and prepare ourselves. What is the use of calling a physician to assist in the administration of nitrous oxid? The nature of the physician's operations is such as to require the use of ether or chloroform, and he does not know as much about nitrous oxid as we do. Physicians have never paid the same attention to the use of this anesthetic as we have, and they are not as familiar with its anesthetic symptoms; they principally have experience with anesthetics that produce a longer period of anesthesia, and I do not see any need for calling them to assist in the administration of nitrous oxid, except in so far as it might be advisable to have some assistance, which might, however, be rendered by another dentist.

Dr. R. C. Young, Anniston, Ala. I suppose that what I said yesterday may be misconstrued. There was a time when I was ashamed of being a dentist; now I am proud of it. Why? Because dentistry is advancing more rapidly than any profession known to the civilized world. I do not wish to lay stress on the inefficiency of the dentist, but to express my desire to make him more efficient. The other day I asked a dentist if he would come to this meeting, and he asked me why he should do so. I told him, Because it would render him a better professional man, make the public appreciate and respect him more, and fit him better for practicing dentistry. He answered that he didn't care to come until the latter part of the week, when the clinics were to be held; that that was about all he cared for. This, gentlemen, is the attitude of a great many members of our profession, and this is why I maintain that we are paying too much attention to the mechanics of our profession. To show you that the public is now ready to open its arms and invite us to come up higher, I would relate a little incident that recently occurred in my practice.

A lady came to my office suffering from cystitis. I prescribed for her, and after three weeks she returned, saying that she could not express her gratitude to me for the relief rendered. A few weeks ago a lady patient needed a urinary analysis, which I made myself with a friend's assistance. I realized that it was in my power to find out her trouble and to call attention to it. Her family physician told me afterwards that the lady was on the verge of a very serious condition.

A specialist in diseases of the nose and throat loaned me a book the other day on eye, ear, and throat diseases, and since reading this book, I believe I am a better dentist. I do not expect to operate on these organs, but there may come a time when I can be of assistance to some of my patients because of having read this book. In this way, gentlemen, I think we can raise ourselves in the estimation of the public and the medical profession. Dr. Brown said that we have no books. Gentlemen, we have more books than we could read if we lived to be a thousand years old. The trouble is, that we do not read the books which we do have.

I must correctly express my views. I have never degraded dentistry; have never said that dentistry is not what it should be, but I have said this—that it should be more than it is. Dentistry occupies a more peculiar position than any other profession. Show me a dentist who is solely a mechanic, and I will show you a man who is a failure; show me a man who is solely theoretical, and I will show you a failure. But show me a man in whom both these qualities are happily blended, and I will show you a man that is a blessing to humanity and an honor to his alma mater and to his profession.

Dr. E. G. QUATTLEBAUM, Columbia, S. C. We seem to be wasting a great deal of time in considering the question: Should every dentist be an oral surgeon, or should every dentist be able to perform complicated surgical operations about the head and face. A man's capabilities are necessarily limited. It is a natural fact that we are limited in our capacities, and no man living can be a first-class oral surgeon and handle cases with the highest degree of skill and at the same time practice dentistry at the chair. This is an age of specializing. I believe that I could fit myself for an oral surgeon, but if I did this I should have to abandon operations at the chair. A man who would perform operations in oral surgery must necessarily be thoroughly equipped for that work. We might as well expect every physician to be a high-class surgeon, as expect every dentist to know how to handle every case occurring in oral surgery. The dentist like the physician, should generally confine himself to one branch and perfect himself to the highest degree in that field. But if he cannot treat some cases, he should not try to, but refer the patient to somebody else. I do not hesitate to amputate the end of an abscessed root, or open into the antrum, but if a dentist were to put a patient into the chair and perform an operation for cleft palate, he would certainly be bold. Even surgeons take their patients to hospitals where they have every facility for performing an operation, which is an entirely different proposition.

Now, to come to a practical point in the treatment of abscesses: I was a little surprised at the gentleman who

mentioned that he had treated several abscesses for a long time, and had not been able to cure them. If I cannot control an abscess in a week, I feel that it is a forlorn hope. There is no use in treating an abscess for a month, because it is a waste of time.

I should be very glad if every dentist could perform surgical operations like Dr. Brophy and Dr. Brown, but if I had a difficult case, I would refer it to some man whom I knew capable of doing the work. When I have to treat a case of alveolar abscess, or an abscess in the antrum, or a small piece of necrosed bone, I never think of calling a physician. I open the putrescent pulp, insert formaldehyd and tricresol and seal it up. If it does not get well in a week or so, I know that I am confronting not a putrescent pulp or an alveolar abscess, but some form of disintegration at the end of the root. The cavity must be sealed in such a way that no formaldehyd is forced through the apical foramen. If that case does not show any improvement in a week's time, the end of the root must be amputated, whereby care must be taken that the root is thoroughly opened. A case of this kind cannot be treated and cured unless the canals are well opened. I have been applying this treatment since the National meeting in Atlanta and I have used it with the greatest comfort to myself and to my patients.

A MEMBER. What per cent. of formaldehyd do you use?

Dr. QUATTLEBAUM. I use a forty per cent. solution of formaldehyd together with tricresol in the proportion of one-third of formaldehyd to two-thirds of tricresol.

A MEMBER. Do you have any irritation from it?

Dr. QUATTLEBAUM. Not unless you force it through the end of the root. If you put this preparation into the root and seal it up carefully with cement, no irritation will ever result from it.

Dr. LUCKIE (closing the discussion). The discussion has drifted away from my subject so far that I shall not attempt to answer any questions that do not relate to the subject of oral surgery. As I said in the beginning, the object of my essay was to excite an interest in the subject of oral surgery. One gentleman said that we cannot all do oral surgery operations, because we have not the means. I did not mean to say that every dentist should do oral surgery or be an oral surgeon, but I do reiterate that every dentist should have a sufficient knowledge of oral surgery so that he may not make a mistake when a patient comes to him suffering from an ailment that is beyond the dentist's control, but may refer the patient to some oral or general surgeon. My sole object in presenting this paper was to bring about a discussion of the subject in a way that would be beneficial to us all. Dr. Quattlebaum says that the dentist would be very foolish to perform an operation for cleft palate in the dental chair. He would be more than foolish to even attempt to give an anesthetic in the dental chair. It is wrong to place a patient in a sitting posture and anesthetize him. I have been so deeply impressed with the necessity of the greater proficiency of the dental profession in anatomy, histology and pathology, that I myself have begun to take a medical course so that I may become a more proficient dentist. I fail to see why a better knowledge of medicine should not be of great benefit to all of us. The case mentioned by me, in which the abscess burrowed its way

down to the neck and caused the patient's death owing to the ignorance of the dentist and the physician, could have been readily cured by the timely extraction of the tooth. The dentist may be proficient in repairing teeth and making bridges, but he is not proficient in oral surgery, as I have learned to realize from my own experience. Oral surgery should attract more attention as a specialty of the dental profession. We need oral surgeons just as much as the surgeon is needed in the medical profession.

The next item on the program was a paper by Dr. I. N. Carr, Durham, N. C., on "Alveolar Abscess Complicated with Necrosis of the Alveolar Process: A Case in Practice," as follows:

Alveolar Abscess Complicated with Necrosis of the Alveolar Process: A Case in Practice.

By I. N. CARR.

The etiology of the case I am about to present is obscure, there being no predisposing cause. Nothing could be ascertained by a close examination and by questioning the patient as to his history, his habits of living, and his general physical condition, to justify any definite conclusions. The patient was a male, twenty-six years of age, with strong constitution and accustomed to outdoor exercise. He was strong and robust in appearance, with no indication whatever of scrofulous, syphilitic, or tuberculous taint. He was on a business trip in an adjoining state when he first noticed pain and soreness in a lower molar on the right side. A slight swelling followed the extraction of the offending tooth. Simultaneously with this, severe neuralgic pains were felt in the maxilla on the right side; sedatives were given, and local applications were made to produce a counter-irritation over the roots of the canine, the lateral and frontal incisor teeth, but to no avail. The patient continued to suffer great pain, yet he was unable to locate it in any tooth. He said his upper teeth had never ached in the least. The neuralgic pains continued in the region of the upper jaw, until volcanic inflammation and swelling of the tissues of that side of the face occurred. Pus was formed and a physician was consulted, who immediately applied his bistoury and by a sharp incision through the swollen gum tissue evacuated the pus, and dismissed him without further treatment. Great relief from pain was at once experienced. The case was left to itself for two weeks, after which time the patient presented himself at my office, when the following conditions were found to be present: The canine, lateral, and front incisor were very loose in their sockets but not appreciably sore to percussion, yet giving that hollow sound indicative of dead pulps. These teeth were beautifully sound, no sign of caries was present anywhere, and no filling had been inserted in any of them except a small approximal porcelain inlay in the central incisor. No traumatic injury had been received. There was no sign of calculus, either

salivary or serumal, no gingivitis—in fact the gingivæ were perfectly hugging the cervical margins of the teeth—but the mucous membrane covering the alveolar process higher up was in a hyperemic state, and three fistulous openings were present leading to the apical space of each root. These fistulæ were intercommunicating, and each of them freely discharged pus into the mouth. By the use of a suitable probe I made a thorough exploration, following the tract of each fistulous opening, and discovered evidence of carious bone.

Some exciting cause must therefore be responsible for the inauguration of this pathological condition, since no predisposing cause could be found. In my endeavor to find that cause, I eliminated every factor that presented itself to my mind, making my diagnosis by exclusion. I decided that pulp-stones in the chamber or nodules in the canals were the morbid agents. To verify my diagnosis I entered the pulp-chamber through the palatal surface of each tooth, of course expecting to find disorganized pulps and a free flow of pus, but to my utter amazement, I found that they were not disorganized, though lifeless, since the blood and nerve supply had been cut off from its main source at the apical foramen. I therefore extracted the entire pulp from each root *en masse*. They were bloodless, of course, yet perfectly retained their form. No pus followed their extirpation, owing to the fact that the foramina were small, and the pus too thick. Upon close examination under a powerful lens, no pulp-stones nor osseous deposits whatever were found to be present. I was nonplused, completely outwitted, and have been trying ever since to discover the exciting cause of so gigantic an eruption. Will someone venture an opinion?

TREATMENT.

There being little or no soreness in the three teeth involved, the dam was applied and the pulps were removed *en masse*. As stated before, they were not decomposed, but came out entire. The canals were then thoroughly sterilized with a fifty per cent. solution of sodium dioxid, followed by eucalyptus oil and iodoform, with which the canals were swabbed; the medicaments were vaporized by the use of the hot-air syringe. Gutta-percha cones impregnated with this oil were introduced and well packed, thus thoroughly disposing of this part of the operation, after which my attention was directed to the overlying bone and soft tissues. First the bistoury was introduced into each fistulous opening and carried well down, and a straight upward incision was made to secure access to sequestra of exfoliated bone, several of which I removed, two being as large as the nail of my little finger. The apices of the roots were found to be free from necrosis, but all of the peridental membrane for two-thirds of the length of the roots had been destroyed on the buccal surface. The periosteum of the alveolar process covering this portion of the roots was of course destroyed, and came away with the exfoliated bone. The narrow rim of process, periosteum, and peridental membrane at the gingival border appeared to have escaped injury during the previous stage of inflammation. The palatal surface of both process and soft tissue appeared perfectly healthy. After removing all the necrosed bone that had exfoliated, the pus cavity

was thoroughly syringed with hot carbolized water, which stopped most of the hemorrhage caused by the incision and the explorations. With a minim syringe I injected aromatic sulfuric acid into the cavities every other day for two weeks, cleansing the other parts every day with hydrogen dioxid. By this means I hoped to avoid a more serious operation, but while the hyperemic condition of the gums greatly improved, and the fistula over the canine and lateral seemed about closed there was still a considerable discharge of a thin, watery and offensive pus, sometimes tinged with blood, that continued to discharge through the fistulous opening over the front incisor root, convincing me that I still had to deal with a true septic abscess, in which the poisonous material was being produced among the tissues themselves, the roots of the teeth having nothing to do with it. I then decided that curetting the bone was necessary to effect a cure. At this stage of the case, knowing that we dentists have no professional rights or privileges in a hospital, I called in a physician, and detailed to him the etiology of the case and the treatment which I had pursued. After exploring the pus cavity, he agreed with me that curetting was necessary. Accordingly, on the following day, the patient by appointment met us at the hospital, was anesthetized, and a vertical incision was made from the frenum to the bicuspid. The bone then was thoroughly curetted, and the entire cavity swabbed with pure carbolic acid, followed by a like swabbing with alcohol. The wound was thoroughly packed with iodoform gauze, two stitches were taken through the gum near the frenum and midway of the incision, one to secure the packing and the other to bring the tissues in juxtaposition in order that the circulation in the gingivæ might not be interfered with. Just before meeting me at the hospital the physician phoned me to bring my forceps along. He was evidently of the opinion that the teeth should be removed. I thought differently, however, and they were not removed. The reason for retaining them under such conditions was that past experience had taught me that although the process is slow, the peridental membrane will be reproduced in nearly every case, provided the gingival margin remains intact. I also knew that under favorable conditions the alveolar wall would be reproduced; while this process is also slow, it is nevertheless sure in the majority of cases, if the parts are kept in an aseptic condition. This is found to be true even though the vessels which enter the apical space are, temporarily, at least, cut off, as the result of the abscess in the apical space, yet the vessels entering there are not the only source of blood supply to the aveolar process, there being another source sufficient in itself to reproduce new bone. I refer to the supply furnished by the vessels of the gum and the periosteum of the outer surface of the process. In the case under consideration the gingival border of the process, the periosteum, and the peridental membrane were in a healthy condition, the palatal surface of both roots and process being in a perfectly normal state, to assist in supplying granulations for the generation of all the lost tissue. The packing was allowed to remain two days, when it was removed, and the wound was found to be healthy. It was syringed with a solution of bichlorid of mercury, 1:2000, and repacked with not more than half the former quantity of packing. This was repeated every

other day for three weeks, using a smaller amount of gauze each time, until finally the wound closed. The teeth remained and were quite firm, and the patient is now using them as though nothing untoward had ever occurred.

It was extremely interesting to watch the case from time to time as the dressing was removed, to note the formation of granulative tissue, to see the gum grow over and attach itself to the sides of the roots that looked like polished ivory when they were first exposed to view, and then finally to reach the triumphal end, with the satisfaction of seeing the teeth looking bright and performing their functions as well as their neighbors. Nature in her wonderful laboratory had wrought the metamorphosis, and humble man watched her processes, and aided in the achievement of her purposes.

Discussion.

Dr. R. B. Adair, Atlanta, Ga. Dr. Carr has left considerable obscurity in the history of the case presented, because the patient came from a distant city, and all that had occurred before the time when the patient came under Dr. Carr's observation is a matter of hearsay. The fact that the trouble originated in the lower jaw, and afterward culminated in the upper jaw, adds an additional element of obscurity.

In my opinion, in the first place, the teeth had nothing to do with the original causation of this disease. In the second place, every dentist should be determined to develop his mental vision so that he can see a little beyond the teeth. Dentists are too apt to look upon the teeth only as the cause of everything. In many cases the origin of disease lies beyond the teeth, and is due to some constitutional trouble. If in the case under discussion, the disease had continued in the mandible, it would have been a clear case of osteomyelitis, but since it moved to the upper jaw, I regard it as a case of periostitis producing the condition described.

As to the operation, the only criticism I have to offer is that the operation was not made sooner. In any case of osteitis or periostitis no time should be lost. I have recently had many cases in my practice that required a vision beyond the teeth. In two cases of Ludwig's angina, I had recourse to the surgeon, and several cases of osteitis I took to the hospitals. The question has been raised why the dentist should not be allowed to take patients to the hospital and to operate on them without calling in the M.D. In Atlanta we have several hospitals with which we are affiliated, and we often have found it necessary to call in the M.D. If we have such a case, we engage a room at the hospital and make the preliminary arrangements for the operation. We never call in a physician unless we desire his advice and want him to share in the responsibility.

I take exception to the solution of mercury bichlorid which the essayist uses. A 1:2000 solution seems rather strong for the average wound, and I would also criticize his use of carbolic acid. His results, however, are beautiful. We know from experience that nature is capable of reproducing the process. Not long ago, in attempting to extract the root of a lower first bicuspid, in which the pus had burrowed up around the apex of the canine as the result of an alveolar abscess, I lifted off the lower left canine and the left lateral, and all of the external process became detached. The patient's husband was informed that all the

parts detached would have to be taken out. Although a surgeon advised us to remove the detached bone and teeth, the lady's husband would not give his consent, and the teeth were put back in proper position and ligated to the other teeth, and within a few months it healed up nicely. I afterward successfully used the canine tooth as a bridge abutment. In my specialty of treating Riggs' disease, I have found that nature will reproduce destroyed osseous tissue about the teeth if the injured part is protected and the patient carries out sanitary instructions.

Dr. Carr's result is a very good one indeed, and I wish to express my appreciation of his paper.

Dr. S. W. Foster, Atlanta, Ga. I did not quite understand Dr. Adair's remarks in regard to the last case cited, where I understood there was a fracture of the alveolar process. Did you take away the process?

Dr. Adair. No.

Dr. Foster. We all know very well that the alveolus is capable of re-uniting in the same way as any other osseous tissue. I myself have never heard of such a case as Dr. Carr has mentioned, where the alveolus reproduced itself after it had been removed *en masse*. I have seen a cartilaginous formation which gave to the tooth a comparatively firm attachment, but I have never observed a case of reproduction of the alveolus after it had been removed *en masse*.

Dr. Adair criticized the essayist for not having operated earlier. From Dr. Carr's description I assume that the patient when he presented himself had typical necrosis of the alveolar process. It is a principle in surgery that wherever we have necrosis nature should be allowed to sever the sequestrum, because in doing this the margin of the necrosis will be reached, and frequently we operate too quickly. If we resect the sequestrum, the periosteum is left in a diseased condition, and that spreads the necrosis farther. I do not believe in operating too soon, and should not criticize the essayist, as I believe that he operated at the proper time, and certainly obtained beautiful results. The essayist manifested his superiority of knowledge over the physician, and deserves credit for asserting himself and not allowing the teeth to be extracted. Dr. Adair's diagnosis of the case with regard to the etiological factor seems to be correct, but as I said, I would not criticize the essayist's method of operating.

Dr. Robin Adair, Atlanta, Ga. The condition cited by the essayist is certainly one of the most serious that confronts the dentist, because of the difficulty of differentiating in the diagnosis between Ludwig's angina, periostitis, or myelitis, and because the patient's life absolutely depends on the method of treatment. We know that many operations of this character have proved fatal because of faulty diagnosis.

In the diagnosis of this case, I should have considered three things. First, the swelling. If there had been an extreme swelling with a minimum amount of pain, I should have pronounced the case to be one of periostitis. I should have immediately made an incision from one end of the alveolus to the other through the whole extent of the swelling, probed for necrosed bone, and dismissed the patient. On the other hand, if there had been a swelling of the glands of the lower jaw, I should have suspected Ludwig's angina or myelitis, and if there was any suspicion at all, it would have been a serious mistake to operate at

once. To differentiate from Ludwig's angina I should have very carefully examined the gland. If it had been swollen I should have suspected Ludwig's angina. On the other hand, if there had been a maximum amount of swelling, and if the teeth had been raised in their sockets, causing great pain, as in this case, I should have pronounced it to be a case of myelitis, and this is one case where the dentist is most adapted to operate, because he has a better knowledge of the surroundings than any general surgeon. Some of these cases are due to pneumococcic infection, which acts very slowly, giving us plenty of time to watch it. In a case I recently operated on, the teeth and gums were perfectly sound and the infection probably extended down the side of the lateral or central. The tissue was infected, owing to a break somewhere. The patient may have stuck a tooth-brush bristle into the gum, and decomposition of food may have caused the infection and the myelitis.

As to the operation, I recently had a case similar to the one reported by Dr. Carr, in which I drilled a series of holes with a long shank cross-cut bur down below the gingival margin and below the roots of the teeth clear to the medullary process, in order to secure thorough drainage, and this operation was successful. The general surgeon would have taken a hammer and chisel, would have completely chiseled off the process down to the marrow of the bone, and would have extracted every tooth involved. In such a case the dentist can do better than the general surgeon, and save the teeth every time. Upon investigation I found that in Atlanta some eight cases had been operated upon, and in every case the patient died except in the one that was operated on by a dentist.

As to the treatment which the essayist suggested, I cannot see any reason why he uses carbolic acid in syringing an infection of this character? The pneumococcus is one of the most resistant germs that we find in the mouth, because even submerging them into carbolic acid does not kill them. The essayist says that they were immediately destroyed with carbolic acid and alcohol. I think that the alcohol did more good than the carbolic acid. In this case I think warm water is better than anything else we can use. Simply wash out the wound and secure proper drainage. I should never use iodoform. I am surprised that Dr. Carr should insert iodoform gauze into the mouth. Even though the medical profession is still using it, the progressive dentist should not do so. I once opened a tooth that had been filled with iodoform, and I can assure you that it was one of the most offensive operations that I have ever performed, on account of the disagreeable odor.

Dr. G. S. Tigner, Atlanta, Ga. I do not wish to discuss the paper at any length, but would simply point out what increased recognition we have gained and are gaining in the field of oral surgery. Last year a paper was presented on the question of our securing representation on the staffs of public hospitals throughout the country, especially in cities where there are a number of hospitals. In pursuance of this idea, we have been active in Georgia, and in two cities, Macon and Atlanta, we have secured representation on the staffs of the public hospitals, securing us just recognition. In regard to oral surgery, we must claim and obtain recognition in our cities by

being represented in the public hospital staffs.

Dr. G. A. CARR, Durham, N. C. I have seen the case which my father has described, and have watched the operation, but it would be useless to enlarge on it. I had treated two or three similar cases, and in each one I had to call in a surgeon, who did the greater part of the work. Not because I did not care to do the work myself, but because I felt that I was his guest at the hospital, and because he seemed to think that he was conferring a favor on me in permitting me to bring my patient there. We have tried to obtain the privileges of the hospitals, but the only way of getting access is to call in an M.D. and to have him assign a room to the patient and be present at the time of the operation. If the dentist is successful in performing such an operation with as good results as my father had, it is all very well, but if the dentist fails, he is criticized for his lack of knowledge and skill. I had a similar case of two upper incisors with two gold fillings in each tooth, the pulps of which were decomposed, having been dead for two years—a chronic abscess was present. When the young man presented himself to me, his lip was swollen, and the case appeared to be one of an ideal abscess. I perforated with a lancet the palatal surface of the gum and evacuated an enormous amount of pus. When the patient returned, the inflammation had subsided, and I entered through the palatal surface and obtained thorough drainage through the canal of the tooth, washing the wound with glyco-thymoline instead of dioxid, of which I was afraid. The case seemed to get along very well for five or six days, but a week later the patient returned, the other tooth being in the same condition. The treatment was the same as in the first case, and seemed to produce good results, but the case had been of such long standing that the process around the teeth became diseased, which I had not expected. I then did what I shall probably be criticized for. I curetted the bone with the patient in my chair, obtaining some benefit. I finally extracted the teeth, hoping that their extraction and the evacuation of the pus would bring about a cure. The case went on for two or three more weeks, and finally I had to call in an M.D., because I wished to take the patient to the hospital for an operation. In the meantime, the surgeon and I discussed the case and agreed that the cause of the trouble was necrosis of the alveolar process, extending over the roots of the lateral and canines. The patient was taken to the hospital, anesthetized, and the surgeon asked me if I would not like to perform the operation myself. I told him that I would prefer to do it myself, but that I should like to have him assume some of the responsibility in case of any unfortunate results. I then removed several large pieces of necrosed bone of black color, fully as large as my thumb-nail, and in a few days the patient recovered.

I should like to ask Dr. Foster how we could secure for our profession the same privileges in the hospitals as the medical men enjoy. I should like to do surgical work and would make a specialty of it. The great trouble is that the public at large and the medical profession are inclined to look on dentists as being merely mechanics. The reason for this is that dentists do not discuss surgical subjects with their medical brethren, who consequently have a poor opinion of our ability along that line.

Dr. FOSTER. The only way in which the dentist will ever receive proper recog-

nition is by self-assertion. As Dr. Carr has said, the average dentist does not feel competent to do surgical work, and if we acknowledge our inability to do this work no one else, of course, will acknowledge that we are qualified and competent to undertake it. We have men like Drs. Brophy, Brown, and others, who are recognized as being capable of performing oral surgical operations better than medical men, and their work will enable us to demand the recognition to which we are entitled.

If you will pardon me, Mr. President, I would like to raise my voice in defense of carbolic acid. Both Drs. Adair seem to have a dislike for carbolic acid. I commend the use of this drug, and I consider it as one of the best antiseptics and as one of the best preparations for stimulating healthy granulation. If it is used in concentrated form in suppurative conditions it will destroy the bacteria present and allow nature to assert itself by healthy granulation. I do not like to hear anyone condemn carbolic acid, and in my opinion the essayist was correct in using it.

Dr. Carr (closing the discussion). I wish to express my sincere thanks for the manner in which you have received my paper, and my appreciation of your discussion, which has been very gratifying to me.

Dr. Foster has taken the words out of my mouth with regard to carbolic acid. After curetting the dead bone, the wound was swabbed with pure carbolic acid, followed with alcohol. I used carbolic acid because of its being a powerful escharotic and good antiseptic, which cauterizes the tissues and produces healthy granulation. I have successfully used it for many years, and I therefore used it in this case. As to iodoform gauze, I wish to say that the general surgeon suggested this treatment, which I fully indorsed and approved of.

The question of the dentist's recognition in the hospitals is rather a big proposition in North Carolina. In our city we have a hospital that is the generous gift of one of our citizens; he has put it under the control of the physicians of the city, and the dentist cannot send any patient there unless he secures a card from one of the attendant physicians. Another hospital is now building there, and the matter of recognizing the dentists is being considered, and we shall probably have no further trouble of this character. There is no objection to having a medical man present at an oral operation, but I claim that the dentist is more capable of performing such an operation than the medical man. The man who attempts to perform oral operations ought to be a medical man—not that he must necessarily have the degree of M.D., but he should be familiar enough with the human body and with medicine to know what to do in the treatment of these cases. There are many dentists taking up this specialty who know more about the treatment of diseases of the oral cavity than any physician in the land.

I thank you very much for the kind attention you have paid to my paper.

The next order of business was the reading of a paper by Dr. W. L. De Laperriere, Winder, Ga., on "Orthodontia," as follows:

Orthodontia.

By W. L. DE LAPERRIERE.

Not being a member of the highest assembly of the profession of dentistry, I fairly realize my incapability to address this distinguished and august body, composed as it is of men of years' experience and scientific accomplishment who have already devoted a lifetime to this profession, and have raised it from its incipiency to its present high standing as one of the foremost professions of the world. I desire to invite your attention to a topic which at the present time is of great interest to our profession, and requires great skill and years of diligent study.

Orthodontia concerns itself with the regulation of the irregularities of the teeth as applied to malposed and rotated teeth. Some authors classify these deformities as malocclusion, and in studying this subject we must not lose sight of the various general appliances; we must also consider the important relations not only of the two arches to each other, but of the various crowns, roots, and every factor that might pertain to the accomplishment of the one and great important aim. The shape of these cusps, crowns and roots is designed by nature to produce the best occlusion and to serve the best purpose in each mouth. Their purpose in life is to thoroughly masticate the food, mashing it and grinding it, and preparing it for easy assimilation. If the teeth occlude perfectly, there can be no irregularity and all the cutting and grinding needed in life is properly performed. Each tooth is so adjusted as to contribute to the support of the other, and to produce perfect harmony. The various muscles, also, that govern the jaw, the lip, and the general facial expression, must be in perfect harmony. Deformities are too often neglected by the average dentist. After diligent study I am fully convinced that occlusion is the basis of orthodontia, and if we attempt a correction our results will be but meager unless perfect occlusion has been established.

I shall therefore direct your attention to articulation especially, and define orthodontia as the science which has for its purpose the correction of irregularities of the teeth and lack of perfect occlusion.

In my first operation to correct some of these irregularities, I very keenly felt a most serious and solemn responsibility that awaited my skill, realizing the possibility of blood-poisoning and the many ever-present dangers that hover around all operations, even the most minute and simple.

Even the simple extraction of a tooth or the treatment of a little abscess may cause death, yet these operations can all be safely performed by the skilled dentist, if the proper caution is taken and proper antiseptics are used.

The dentist must take up his work with confidence, trusting that he serves mankind by assisting nature in arranging facial expressions and in beautifying many faces by the restoration of symmetry to the teeth.

In the mouth of every patient the present conditions and causes must be

carefully diagnosed, otherwise you will have very poor results. The various treatments, appliances, devices, and so on, can only be determined by the actual needs of the patient. A thorough understanding of occlusion is the key to the correction of all cases of disarrangement of the teeth that might be presented.

The care of the deciduous teeth cannot be overestimated; all the molars especially should be preserved until the first permanent molar has erupted, in order to preserve the arch complete. Each dental arch furnishing its own peculiar graceful curves, little time is required to influence the permanent teeth during their eruption. Teeth trained from their incipiency or prearranged by skilled men of our profession grow to usefulness and serve their best purpose for the human race, beautifying it to no small degree.

Science has given to the world and to coming generations the fruits of her endeavors. She has rifted the hills of ignorance and rolled the thunder of progress and flashed the lightning of invention and discovery to the remotest corner of our globe. And a people transformed and mighty have made a conquest of the earth on behalf of truth, of liberty, fraternity, and of human equality. In physical and chemical science the names of Fittig, Remsen, Huxley, and John Stuart Mill have forever been blazoned upon the curtain of time. In mathematical science the memory of such men as Euclid, Archimedes, Cauchy, Taylor, and Bledsoe will never fade. In medical science, humanity will ever fondly cherish the names of Pasteur, and of him who discovered anesthesia in modern surgery. In this galaxy of pioneers in the unexplored realms of scientific research, while last in my enumeration yet far from least in benefiting humanity and in illuminating the world with the beacon of truth, stand the names of William Crenshaw, B. Holly Smith, and Edward C. Kirk, through whose indefatigable efforts, untiring energy and philanthropic designs our own profession has emerged from chaos and has risen to its present stage of perfection. These notable men have achieved great success, yet great work is still left for the craftsmen of the present day. The greatest singers will tell us that the neglect of one day's exercise of the vocal cords means the creeping in of flabby notes. When the noted scientist Wallace was traveling over the deserted plains of the Euphrates, he noticed that wheat had reverted to wild rice, from which it had been derived, and that the roses, once full and of every hue, had returned to their wild state, being single and pink in color. The neglect of any faculty is fatal, and nature withdraws her gifts when neglected and misused. Let us strive each day to improve our profession, not from the sordid incentive of pecuniary emolument or for personal aggrandizement, but that generations to come may look back upon us with pride and reverence as upon their forefathers who ever lived to bless mankind.

The next order of business was the report of the Committee on the President's Address, by Dr. G. S. Vann, chairman, as follows:

Report of Committee on the President's Address.

First: We note with special pleasure the reference made by our president with regard to the cordiality of feeling on the part of the officers and members of the Alabama Dental Association, and their willingness to co-

operate in every respect with the officers of the Southern Branch, N. D. A., in making this a great and successful meeting.

Second: We commend the special effort put forth by the president to advertise the meeting by personal letters and invitations extended to so large a number of dentists throughout the country, especially since there has been no meeting since February 1905.

Third: With reference to the president's departure from the usual custom of appointing large committees, we are not as yet prepared to say that this plan is conducive to the best interest of the association.

Fourth: We heartily commend the idea of a printed bulletin showing the work of each session.

Fifth: We recommend that a committee of three be appointed to draft suitable resolutions of encouragement and approval of the higher standard of educational requirements instituted by the dental colleges, of untiring and unselfish labors on part of the state boards of dental examiners, and of the indorsement by the state dental societies of the maintenance of this high standard.

Sixth: We join our president in the hope that some movement may be inaugurated whereby an equitable interchange of state license may be made acceptable.

Seventh: We most heartily join our president in an approval of the long struggle on the part of the committee appointed by the national body on army and navy legislation, and urge them to keep up the fight until victory shall have been achieved. We consider this one of the most important subjects before the dental profession at the present day, and every dentist should feel a personal interest in this bill. We exceedingly regret that this matter has received so much adverse criticism from many of our most prominent dentists.

Eighth: The plan outlined as to the appointment of a committee of five or seven for the increase of membership in the National Dental Association from the South we believe a most excellent idea, and we recommend that such a committee be appointed.

Respectfully submitted,

GEO. S. VANN,
F. A. JOHNSTON,
S. W. FOSTER.

The report on the President's address was on motion adopted.

Dr. W. R. WRIGHT, Jackson, Miss., then presented the following resolutions on the death of Mrs. J. M. Walker:

Mrs. J. M. Walker.

In the death of Mrs. Jeanie Mort Walker November 7, 1907, one of earth's choicest spirits went home. She was born in the state of New York in 1836, but came South while still on the threshold of young womanhood, and devoted the earlier years of her life to the work of teaching. Though born in another section, she ardently sympathized with the Southern cause, and at the close of the Civil War was married to Dr. J. R. Walker, an officer in the Confederate army. From that time on she made her home in New Orleans, also having a summer home in Bay St. Louis, Miss. Although possessing qualities of heart and mind which gave her a large interest in the public welfare, she was a loyal and devoted wife and mother, giving to the charmed inner circle of her loved ones the richest treasures of her radiant life. In her case the words of the wise man have been fulfilled: "Her children rise up and call her blessed." Endowed with scholarly instincts and possessing broad sympathies and liberal culture, she made herself felt in the world of letters. She contributed liberally to the columns of the New Orleans papers and wrote many stories and poems. She was the author of "The Life of Captain Frye, the Cuban Martyr."

As the wife of a dentist and the mother of a dentist, it is not strange that she became vitally interested in this profession and enriched its literature with some of the best fruits of her writing. She wrote "Letters from a Mother to a Mother on the Formation, Growth, and Care of Children's Teeth." This work proved to be very popular, and is highly recommended by the dental profession as a book of instruction suitable to the needs of the laity. In her later years she became a regular contributor to dental journals, devoting her rare talents to the literature of the profession. The department of "Practical Points," one of the most popular

features of the *Dental Brief*, owed its existence to her and was ably edited by her until her death.

Mrs. Walker was an honorary member of the state dental associations of Mississippi, Alabama, and Georgia, also of the Southern Dental Association. She also rendered valuable service as press reporter for the meetings of these bodies.

In whatever form of service her kindly nature manifested itself, she always evinced those qualities of character which marked her as the servant of God and the friend of humanity. Without ostentation, she impressed all who knew her with her disinterested altruism and unfaltering faith. Earth is poorer and heaven is richer by her going.

RESOLUTIONS.

Whereas, God in his infinite wisdom has removed from its earthly tabernacle this choice spirit, therefore be it

RESOLVED, That herein we express our high appreciation of her beautiful life and invaluable services rendered our association and our profession in general, at the same time deploring our unspeakable loss; and be it

RESOLVED, That we extend our heartfelt sympathy to the inner circle of her family, whose loss is greater than that of all others; and be it further

RESOLVED, That these resolutions be spread upon our minutes and a copy furnished to the bereaved family.

The motion was made and carried that the resolutions presented by Dr. Wright be unanimously adopted.

The meeting then adjourned until 2 o'clock P.M.

SECOND DAY—Afternoon Session.

The meeting was called to order Wednesday afternoon at 2 o'clock, May 13th, by the president, Dr. Melendy.

The first order of business was the report of Section IV (Operative Dentistry), by Dr. J. T. MEADORS, Nashville, Tenn., chairman, as follows:

Report of the Committee on Operative Dentistry.

Mr. President and Members of the Southern Branch, National Dental Association:

Ladies and gentlemen,—According to the promise of our members, and also according to our printed program, it would have been my duty to announce to you the contributions of three members. Two of these members not having yet arrived and not having submitted their papers, I have the honor of announcing for discussion under the Section of Operative Dentistry only one paper—"The Dowel of the Bandless Crown," by Dr. J. H. Crossland, Montgomery, Alabama.

Before dismissing this committee, I hope the association will grant me time to briefly call attention to some subjects which are entitled to come under this section, and which have not yet been discussed.

To the mind of the chairman of your committee, nothing appears at present to be of more importance in dental operations than the practice of casting gold inlays, crowns, bridges, etc.

Since the advent of the first method of casting gold inlays, that of Dr. Taggart, which occurred perhaps eighteen months ago, it is claimed that about sixty different machines have been placed upon the market. In some of these devices compressed air is used to advantage, in others direct pressure from machines which are supplied with so-called

"Castine" is used to confine and compress the air, and in others wet asbestos is used, steam being produced by the extreme heat, which when confined, forces the molten material into the ingot through the gate, or sprue hole. Other machines which are devised upon such plans as to make use of the centrifugal force, have claimed the practitioner's interest, hence I deem it of great importance to the individual members of this association that we take up for discussion "The Cast Gold Inlay."

Judging from the numbers of machines which are being sold, the practitioner of dentistry must realize that a new epoch in dentistry has arrived.

The inlay made by the swaged matrix method has been superseded, and the profession seems bent upon casting gold for most every restoring apparatus for lost tooth-structure.

The gold inlay has been a boom to dentistry, in that it limits the demand for crowns; it limits the time required for inserting gold, stopping cavities, and affords easy and accurate operations which would otherwise be tedious, and perhaps faulty; besides, the casting of gold in the making of crowns and bridges has asserted its claims upon progressive dentistry.

The proper preparation of cavities, securing perfect wax forms, also the proper retentive form, should be impressed upon our members, so that the best results may be accomplished by the use of this method.

The question naturally arises: In what respect should the use of this method be limited in order to guarantee the best results for the patient and the profession?

No less important is the subject of porcelain inlays. Dentistry has come to the age of its crystallization as a profession, where esthetics has made just claim upon all operations that are to supply lost tooth-structure, and has accepted porcelain as the means for supplying such needs. There are enthusiasts upon this subject, and I hope that during this session the question of where and how to make use of porcelain in preference to other stoppings will be discussed by those who have had sufficient experience to advise us.

Perhaps the nearest approach to an ideal plastic filling material offered to the profession is represented by Ascher's Artificial Enamel. Many articles have appeared in our journals during the past year in which authors testify to its worth as a permanent esthetic filling material. Since its appearance upon the market, many of those present have had sufficient experience with this material for cavity stopping to enlighten this body as to the indications for and advisability of its use.

I ask, Mr. President, that you will allow also this subject to be opened for discussion.

During the enthusiasm which now prevails over the use of inlays, I beg that we be not neglectful of the judicious use of gold foil. It is my belief that no material is more indicated in ordinary simple or medium-sized complex cavities, if esthetic considerations permit, than non-cohesive gold foil, keyed if necessary with cohesive gold. The entire operation should be done by hand pressure, only in the final condensation of the surface of the filling an automatic mallet with Royce patterned plugger points may be used.

These subjects which I have named I consider of such importance that I request time for their discussion.

Respectfully submitted,

JOS. T. MEADORS,
Chairman.

Discussion.

Dr. J. P. GRAY, Nashville, Tenn. I think the report is a timely and excellent one. It has always been doubtful to my mind to which department of which section crown and bridge work should be detailed. It has been placed in the prosthetic department heretofore, and it is a question as to whether it should be classed with this work or not, and in which department inlays and inlay work should be classed. In any case, this important subject should be thoroughly discussed.

I am aware of the fact that the gold inlay has come to stay, but I fear that it is overestimated. Everybody is wild over inlays, and some dentists are using them where they should apply the plug-

ger. It requires skill to use the plugger, as well as to insert a gold inlay, but today many cavities are filled with gold inlays which should be filled by use of the plugger. I recall the fact that a few years ago everybody enthused over the porcelain inlay, but I find that the best operators are becoming cooler and are recommending conservatism in this line of work. A similar craze is now raging over the subject of artificial enamel. The other day a dentist, a fine operator, told me that he rarely ever inserts a gold filling any more. He has been using the artificial enamel for about two years and claims to have had no failures at all. He probably has not seen all the cases. I know that he has failures with gold, although he is a fine manipulator of that material, and am sure that he is going to have failures with the enamel. The trouble with the inlay, the gold inlay, or the inlay that is made from Ascher's artificial enamel or from some other cement, is that it is liable to produce in time a condition that is not wholesome for the dentist. The dentist will lose his manipulative skill in inserting inlays, and we therefore should keep in close touch with the old methods. I believe in progress, and I hope that the time will come when we can insert fillings with cements and when gold inlays can be melted directly into the teeth, but it would be detrimental to the profession if we reach the point where cement will answer this purpose. Then we shall lose our great manipulative skill, and many men will practice dentistry who should not be in the profession. I therefore beseech you to use judgment in inserting inlays until we have proved the merits of this work beyond any doubt.

Dr. William Crenshaw, Atlanta, Ga. I too indorse Dr. Meadors' suggestion that we should not abandon the use of fillings too much in favor of the inlays. There is, as Dr. Gray has suggested and as has been said in a number of discussions on this and other subjects, no question that the method of gold inlays has been advanced too rapidly and too far. It is very difficult to realize the limitations of such a fascinating subject as this. Cataphoresis had its day six or eight years ago, but it has now been abandoned by the majority of dentists. Porcelain was everything four or five years ago, and while it is very valuable in its place and should not be abandoned, it has been pressed too far. Certain other phases of the work have not been nor can ever be pressed too far, but the men who unconditionally advocate inlays in molars and bicuspids and far beneath the gums have met with failures. It is difficult to make a wax impression in a cavity that extends below the gum and obtain the proper contour of the invisible portion of the tooth. Here, instead of inlays, amalgam or—by the use of the matrix—soft foil should be placed, because these materials are soft enough to be worked down to the contour of the teeth. If the form of the wax cannot be adapted to the exact contour under the gum, the gold inlay after it is set will never fit under the gum.

Dr. Meadors in his report correctly called attention to the fact that we may go too far in the practice of inlays. It is well to suggest that we cling to the old methods of using foils in the particular places which I have indicated, namely, between the molars and bicuspids in cavities extending below the gum margins.

Dr. W. R. Renalds, Salem, Va. I have not done a great deal of cast inlay work, but after seeing Dr. Taggart

demonstrate the work of his casting machine at the Jamestown Dental Convention, I have been endeavoring to do something along that line by making the pattern hollow and reproducing it in the cast, thereby giving the finished work, after cementing it to place, a more stable attachment to the tooth.

My technique is as follows: After the cavity has been prepared in the usual way for inlay work and the wax pattern has been completed according to the Taggart method, remove the pattern and embed the outer surface in freshly mixed plaster, thus forming a matrix around the inlay pattern. As soon as the plaster has set, immerse the matrix with the pattern in ice-water, and allow the wax to thoroughly chill.

Remove all moisture from the pattern and with a specially devised instrument in the engine handpiece, cut off the convexity of the pattern, until a line is reached which has been previously drawn at the desired distance from the edge of the pattern to approximately correspond to the subsequent line of cement.

The cavity in the pattern is then made by further cutting into the central part and by slightly recessing in order to form a dovetail lock for the cement. The matrix, together with the pattern, is then immersed in warm water of about 100° to remove the chill from the edges of the pattern. The plaster is then cut and broken away from the edges of the pattern, and the pattern removed from the plaster. The pattern is then returned to the cavity, reseated, and the edges are retouched with a burnisher to correct any distortion that might have occurred in the cutting process.

To prevent air-bubbles in the pattern cavity, the investment should be placed into it with a suitable brush, and then every possible particle should be blown out, and again refilled. When the correct fit of the cast inlay has been determined, a lock or slight undercut is made in the tooth-cavity, and the inlay, when cemented to place, is firmly held by a dovetail lock of cement in the inlay and tooth. By this method the inlay is not only more strongly anchored to the tooth, but a saving of from twenty-five to forty per cent. of gold is effected.

In medium and smaller-sized cavities my method of inlaying with gold is as follows: Prepare the cavity with very slight undercuts, place into it a small quantity of cement mixed at about the consistency used in setting inlays; place over the cement a mat of Watts' crystal gold annealed, two or three times as broad as the cavity, press it into the bottom of cavity, fold the projecting portion over on the first layer, holding the central portion with a suitable instrument to prevent rocking, and with another instrument work the gold under the undercut; force out the surplus cement, and burnish the gold against the walls of the cavity in order that no cement be left exposed. When the cement has sufficiently hardened, proceed to build out with cohesive gold, either crystal or sheet foil.

This method gives an inlay with even better anchorage than is obtained in the cast work, though it be of the hollow type, and no cement line is visible. Inlays can be built into medium sized single cavities much more quickly than by casting them.

In making the union between the layers of mat gold overlying the cement and that layer used to complete the operation, hand instruments are preferable, until the inlay is about flush with the margins of the cavity, when the mallet

may be used for the building-out of the contour.

The wax-cutters used in excavating the pattern in the cast work can be obtained from the S. S. White Dental Mfg. Co.

The next order of business was a paper by Dr. J. H. Crossland, Montgomery, Ala., on "The Dowel of the Bandless Crown."

The paper here follows:

The Dowel of the Bandless Crown.

By J. H. CROSSLAND.

Conspicuous among those gleaming, glittering, cruel things which have held high precedence in the golden age of dentistry, and from which progressive practice has receded to such extent that conservatism permits their use occasionally, instead of demanding it generally, is the banded crown.

Perhaps no modern dentist will challenge the statement that progressive practice is not all that has receded from this crown, which came to the pioneers of the golden era with the full sanction of mechanical laws, but which has so signally and so generally failed to meet the imperious demands of physiological laws.

Analysis of the two forms of crowns, with their modifications, discloses to the essayist the following points: In favor of the banded: superiority in strength of attachment and protection of cement from agencies of disintegration; esthetic, physiological, indeed all other requisites in favor of the bandless. After having fitted (?) many bands he has become profoundly impressed with the idea that no crown should have a band when reliable attachment can otherwise be made. A dislodged or stretched and bent dowel is by no means a pleasing discovery to make on the complaint of a patient who was so highly pleased with the beautiful porcelain crown set only a few months ago; and a split root is easily among the most melancholy returns which our labors may bring us.

What is the usual cause of such results, especially in cases in which the root was fairly strong? It is the shortness or thinness, or both, of the dowel —a question of natural philosophy, of leverage primarily, and secondarily of cutting. Shortening the dowel facilitates so greatly the adaptation of the porcelain crown that it seems to be almost universally resorted to. The effect of the same is to place the weight and the fulcrum nearer together and increase the leverage, and, of course, correspondingly decrease the force necessary to move the weight or crush the fulcrum, or bend or break the lever. And the thinness of the dowel, like the sharpness of an edge tool, lessens the pressure necessary to cause penetration.

Had we a variety of cement approximating in tenacity the root itself and at the same time impervious to the chemical agencies so disastrous to those which we have, the length and size of the dowel would concern us but little and the split root would be no longer among the dismal probabilities which we must consider in determining the form of crown for a frail root. But, unfortunately, we are yet without that splendid acquisition. Indeed, the best that we have is barely worthy of the name. We have adopted

many valuable procedures from the arts and mechanics; let us adopt another. Being unable to increase the tenacity and adhesiveness of the binding material, let us increase the surface to which it is to adhere, and at the same time decrease the amount of it by making a closer joint, after the manner of the cabinetmaker, with his dowel and his glue, or any mechanic using a cement weaker than the substance to be joined. For illustration, let us select an incisor root of decidedly conical form and quite extensively decayed in the gingival region, and that form of porcelain crown in which are united the poetry and philosophy of tooth-crowning—the Logan.

Place just enough filling material in the apical foramen to close it and not be dislodged by the pressure of the cement. Having ground the root to the desired form, shorten and sharpen the dowel, if necessary, sufficiently to allow the crown to come into contact with the root without its tightening in the canal —even though to accomplish this it may be necessary to remove half or two-thirds of its length—which will greatly facilitate its adjustment. Fit the crown by grinding, and if necessary bake-on additional porcelain. Cut a piece of platinum foil such as we use for inlays to rectangular form, making its width somewhat greater than the length of the canal—its length being dependent upon the size of the canal. Perforate it freely with a plate punch or an Ainsworth rubber-dam punch to permit ingress of the solder, then, having rolled it into the form of a cornucopia, approximating the size of the canal, place it over the stub of the dowel and press the crown to place. Remove the crown and remove the foil from the dowel or from the canal, clip off the surplus, return it and replace the crown. Remove the crown; the foil will generally come away with it, but if it does not, split the stub of the post and spread the ends, or wrap a piece of fine platinum wire around it, and press to place again. Then remove the crown and the foil will come with it. The foil and dowel, or stub of the same, are then united by soldering, and the latter filled in or made sufficiently stiff. Should the soldering cause it to fail to enter the canal entirely, carry in a little rouge on a wisp of cotton, insert the post, and remove; touch red spots with a stone. Thus we make the dowel fill practically all of the canal. The essayist has applied this method for several years and has found it highly satisfactory.

A simple and easy way to enlarge a dowel is to wind fine platinum wire around it until it approximately fits the canal, and unite the wire and post by soldering. This method is best suited to cases in which it is not necessary to lengthen the pin; but a little experience will enable one to so manipulate the wire that lengthening will result. This method has also been found very convenient and valuable.

Another method of either enlarging or lengthening, or both, is to fill the canal with wax and press the crown to place, and remove all, and cast gold to reproduce the form of the wax. Of course, the gold may be cast on the pin or separate from it, with a canal for it, and the gold and post may be united by soldering, or the gold set in the canal, and the crown set as in the usual way. Gutta-percha may be used for one or both settings. The latter method is offered as a suggestion only, as it is an untried idea of the essayist.

The extent to which a small canal should be enlarged to permit the enlarge-

ment of the dowel—just how much should be taken from the root and given to the post—is always a question for the judgment of the operator; but the question of leverage referred to above should always be thoroughly considered, for it is a plain mechanical fact that, other things being equal, addition to the length of the dowel diminishes the liability of splitting the root as well as breaking or bending or dislodging the dowel.

Thus may we widen the field of usefulness of the bandless crown. The object of this effort is not to depreciate the value of the banded crown—the Richmond was our ideal of other days, and we resort to it now in some instances. When the frailty of the root and the limited tenacity of the cement prohibit reliance upon the dowel alone, we choose it as a lesser evil than a plate or a bridge.

Reference to a considerable variety of cases to which these methods are applicable, together with a number of details necessary in the adjustment to them, are omitted for brevity's sake.

In conclusion, apology is offered for having consumed so much valuable time in saying, *Lengthen and enlarge the dowel of the bandless crown.*

Discussion.

Dr. W. W. Westmoreland, Columbus, Miss. I have enjoyed this paper very much, but I hardly know what to say on the subject in opening the discussion. Being one of the oldest practitioners present, and my father having been a dentist before me, I ought to know a good deal about the subject, but my experience has not been extensive, as I have had a smaller practice than any of the men that I meet at dental assemblies. I work for the same people all the time, and have done so in the same office for thirty-three years. I have had many successes and many failures. In connection with the bandless crown, I wish to report a case that came under my observation. I had the pleasure of replacing two central incisors that had been put on by my father thirty-six years before on wooden pins. This simply goes to show that we cannot always tell what work is going to last. Some of the best work I have ever done did not last, and some of my poorest work seemed to last very well. Of the different crowns the Logan crown suits me best. I do not like the banded crown because of the inflammation that it causes around the teeth, and I do not see its advantage unless, of course, the teeth are used as abutments for bridges. I am very glad that Dr. Crossland has brought the subject before the association, because we all do a great deal of this work. I never use gold crowns in front, only on back teeth. I have inserted only one in my life, and I have always been ashamed of it.

I have to offer no criticism of Dr. Crossland's work.

Dr. H. T. Stewart, Memphis, Tenn. The question of the banded crown and the unbanded crown to my mind is ultimately an individual one, and the success of the crown depends entirely on the case. In many cases the bandless crown is preferable, if you have, for instance, no special use for the support of the band. I do not think that the banded crown if correctly made necessarily produces an irritation. I believe that Dr. Crossland is right when he says that in a great majority of cases it would be better for the profession if they would adhere more closely to the bandless crown.

There are, however, so many cases where the banded crown is needed that I would emphasize the fact that they can be made so as to cause no irritation to the gum. As a rule, this depends on the way the root is shaped. Very few roots are correctly shaped before the band is put on. If a sufficiently conical shape is given to the root and if the band is properly adapted, there is no reason for any irritation.

Dr. CROSSLAND. What do you mean by conical shape?

Dr. STEWART. Shaping the root so that it is somewhat larger below the gum than above. I find that the band and the floor for the band can be better prepared and adapted to the root by taking an impression as for an inlay, making a cement model, and swaging the band and the floor of the band at once. It took me a good many years to come to this conclusion, but I now use this method altogether. I swage the band out of pure gold, and after swaging, burnish it to the root. In reinforcing it with solder I try to get the outer surfaces of the band almost parallel, so that there is no shoulder where the root begins and the band ends. Both crowns have their place, and I would emphasize the point that the banded crown can be constructed so that there will be no irritation of the gum.

Dr. CELIA RICH, Nashville, Tenn. The purpose of the band on the Richmond crown is not only to strengthen the root but to protect the cervical end of the root as well, by encasing it.

With the casting apparatus at our command, a crown may be constructed that fits to the end of the root with such absolute accuracy as to do away with the necessity for further protection at this point. Whether a perfectly fitted band would irritate the gum is hard to say, because we see very few, in fact, practically no bands that fit perfectly.

I should like to offer a suggestion for making a cap and dowel as a base for a crown. After loosely fitting the iridioplatinum or pure platinum pin to the canal, solder to it a piece of gold plate somewhat smaller than the root-end, at such a point that when the pin is placed in the prepared canal, the plate of gold will slightly stand off from the end of the root.

Now roughen the pin, run your casting wax over both pin and gold, and press the whole into position. The piece of plate holds the wax in shape, preventing any displacement in removing it from the root, and the result is a closely fitting pin and cap.

This method will be found of especial advantage in cases where two pins are used, for obvious reasons.

Dr. A. J. COTTRELL, Knoxville, Tenn. I suppose that the question of what kind of crown should be used will never be definitely settled, as each one has his own preference. Into this question, as in everything else, the personal equation enters largely. After many years of observation and experience, I have come to the conclusion that in normal cases there is absolutely nothing to be gained from the use of the band on a crown. I do not believe that in normal cases the band is ever necessary or adds one iota of strength or durability to the crown.

I am glad that the essayist has brought out the method of enlarging the Logan dowel, because the Logan crown, to my mind, is always reliable. I have long been regretting that we have not had some way of making the dowel fit the root, particularly if the root is slightly

enlarged by decay, and I wish to personally thank Dr. Crossland for his suggestion.

Dr. E. C. Yielding, Birmingham, Ala. I have been very much impressed with the essayist's idea of fixing the dowel for the Logan crown so that it more accurately fits the root-canal than any regular crown. Unlike my friend Dr. Westmoreland and the other gentleman, I have not had many years of experience with bands. I was, however, very much impressed while still in college with the fact that the band going under the soft tissues was impractical. There are instances when it is the best appliance, but I have never used the band if the root was sufficiently strong to support anything else. During the few years of my experience I have observed that even the very best operators' bands of some years' standing almost invariably produce some irritation, and finally some recession of the gum. Hence I think that the gold band should not be used unless the root has no such support as the accurately fitted band will afford.

I wish to thank Dr. Crossland for the idea of enlarging the dowel. It produces a much stronger crown and is a splendid method.

Dr. A. A. Pearson, Montgomery, Ala. I was very much pleased with the method of adapting the crown which the essayist has suggested. I have not used the bandless crown as much as some other operators. No root has ever split on which I had placed a banded crown, but I have had to remove many bandless crowns from split roots. Everything has its place. I never confine myself to any one crown, to any one filling material, or to any one other thing, but I try to adapt all these different articles to the case under treatment.

Dr. Crossland (closing the discussion). It was not the object of my paper to detract one iota from the value of the banded crown in cases where it is necessary to use it. I believe that in every instance where we resort to the band around the tooth, we are simply choosing the band as the lesser of two evils. It does not belong there; nature may tolerate it in some instances for a time, but she always resents the presence of gold under the gum, and it is wrong practice to put a band around a root when it can be avoided. The principal thought contained in the paper is that after you have decided to use a bandless crown the dowel should be made as long and as large as the dimensions of the canal will permit.

It is purely and simply a question of practical mechanics—the longer the dowel is, the greater force is required to split the root. The farther from each other the weight and the fulcrum are, the more weight is required to split the root, or to break or dislodge the dowel, which seems to be a very important reason why the dowel should be lengthened and enlarged. As I said in the paper, when a mechanic uses a cement which is weaker than the two substances to be joined together, he must make as close a joint as possible, which is no exception to the general laws of mechanics. The tensile force, if I may use such a term, which is necessary to dislodge a crown, has to be much greater in the case of a long than in that of a short dowel. I believe there are hundreds of cases where the roots are split simply because the dowel is short and thin; for a thin dowel will split a root more easily than a large one for the same reason that a sharp knife will require less force to cut than a dull one. The thin dowel will cut

through the cement and come in contact with the root under the exertion of less force than if the dowel has been made longer and thicker. The idea which Dr. Rich has suggested is well worth all the trouble that I have had in writing this paper and in preparing this specimen, and I intend to use this method in the future. I have never set a crown that lasted as long as the one Dr. Westmoreland mentioned, but I hope some of those which I have set in this way will last so long.

In conclusion, I wish to say that I desire to be distinctly understood as not attempting to state when the bandless or the banded crown should be used; but simply to indicate that if a bandless crown is used the dowel should be made as long and as large as possible.

The secretary, Dr. Frink, was instructed to send greetings from the association to the Daughters of the Confederacy, who were in session in an adjoining room.

The next order of business was the reading of a paper by Dr. H. T. STEWART, Memphis, Tenn., on "Riggs' Disease Yesterday, Today, and Tomorrow," as follows:

Riggs' Disease Yesterday, Today, and Tomorrow.

By H. T. STEWART.

I QUOTE from a paper which I read in 1896:

"It is hard to say anything on Riggs' disease that has not been said a hundred times before. In all the field of dental literature there is no topic so much discussed—no subject so threadbare.

"We hear it at every chance meeting with a brother dentist; we have listened to it at every association we ever attended in our lives, and we see in almost every number of every journal that is published somebody's theory as to its cause and somebody's suggestion for its cure. So much has been written from which we are able to glean no real knowledge; so much has been said that is only a repetition of what we have impatiently listened to since our earliest recollection; there have been given us ideas and remedies of so many men who, after stating all they know, end up by virtually admitting: 'I do not know its cause, I cannot effect its cure,' that it is usually with absolute indifference or ill-disguised impatience that we listen to a paper on this nightmare of the dental profession."

I quote from Dr. William H. Trueman, who in the same year (1896) in reviewing the literature of more than a century, has given us so concise a history of the manner in which the profession have dealt with this disease that I cannot refrain from citing at length in his own exquisite language. He says:

"Dr. Junius Cravens now recommends a procedure very closely resembling that advocated by Thomas Berdmore, a distinguished dentist of London, in a work he published in 1770; so closely, indeed, that we are tempted to ask: Have we, in the intervening century and a quarter, simply swung round in a circle? Berdmore in 1770 says: 'The treatment is partly medical and partly surgical. The

former consists in removing the original disease of the whole body by a due course of medicine, and in washing the mouth frequently with antiseptic and astringent liquors, rendered slightly acid by means of orange, lemon, or sorrel juice, or vinegar. The surgical treatment consists in scarifying and pricking the affected gums, and destroying their tender outer skin in such a manner as to occasion a fresh shooting forth and elongation of their substance, and such a solidity as will endure the usual impressions of mastication. When the gums have lost their connection with the teeth, or when they do not embrace them closely, cutting a small slip away from the fore part is of considerable service, for the new gum will then adhere to the tooth, or at least it will embrace it more closely.'

"He recognizes the importance of first cleansing the teeth of all deposits, and states that the scarifying or cutting of the gum may have to be frequently repeated. Berdmore claims that when the patient will submit to the necessary treatment and follow closely his directions, the surgeon-dentist will seldom fail of success in cases of this kind.

"This close identity of the late suggested treatment of pyorrhea and that in vogue so long ago is quite suggestive, and well deserves your careful attention. I say in vogue so long ago, for Berdmore does not claim this treatment as his; indeed it seems to have been the common practice long before his advent into the dental world. Unanimity of experience in treating this disorder seems to have been, in that day as in this, sadly wanting. Robert Woofendale, writing in 1783, referring to the treatment recommended by Berdmore and to the case Berdmore especially reports, says: 'Such cases I have frequently seen, but never cured one, nor have I seen one of the same kind or anything like it cured by any other person.' He further says: 'Lancing the gums to prevent the scurvy in them is with some people a fashionable operation, which they have performed regularly, some once a month, some once a week, or oftener, supposing that it will prevent or remove all complaints of the gums, teeth, and their connections. By observation, however, this operation performed in such a manner by no means proves such expectations well founded. The operation, frequently repeated, may be lucrative to the operator, but in my humble opinion is of little, if any, advantage to the teeth or gums of the patient.'

"Robert Woofendale was a student of Thomas Berdmore. I note here and there throughout his book a disposition to give his preceptor a sly rap now and again. I note, also, in dental literature of recent date, that this disposition is still manifested by some of our profession who fail to see matters in the same way their brethren do. I still further note that this disposition at times is a serious clog to real progress, in that it provokes antagonism, fosters an unreceptive spirit, and prevents a bringing together, careful sifting, and equitable comparison of our varied experiences, by which process alone can they be made practically useful. Berdmore considered this disorder curable, even when it had far progressed, and claimed as part of the cure a reproduction of lost tissue. Woofendale claimed that it is usually curable, so long as there remained, embedding the roots of the teeth, enough tooth-supporting tissue to securely hold them. He contends that to restore to health the disordered tissues is all that can be expected, and both agree that to

retain them in this condition requires constant care and continued watchfulness on the part of the patient.

"Woofendale further says, and this with emphasis: 'When the exposure of the root is occasioned by accident, as a bruise, a cut, or the like, it will frequently be restored by nature, generally without the assistance of art, but when the smallest part of the roots of the teeth are exposed, in consequence of the adhesion of tartar on them, by the scurvy in the gums, venereal infection, or the imprudent use of mercury, I never saw the least disposition of the gum to grow to the teeth, although assisted by scarification, or by stimulating, balsamic, astringent, or other sort of washes or applications; the gums would as soon grow to a piece of ivory or iron as to the root of a tooth which has lost its periosteum from any of the causes here alluded to.'

"Jourdain writes dolefully of this disorder, and says: 'Those who think they have made cures by scarifications, etc., by cautery, issues, and the like, have confounded this with suppurative fungus of the gums alone. I have seen many cases treated by these so-called successful remedies, and I may safely say I have yet to see the first cure performed.'

"How very like the remarks in reported discussions on this subject in this year of grace are these, culled from writers of more than a century ago, writers who were well conversant with, and who have actually described this and other allied disorders of the teeth and gums that in their day, as in ours, in spite of their efforts and in spite of our efforts, result in a much-to-be-deplored tooth-loss. With them, as with us, whether these disorders were merely local or were wholly or in part systemic was a much-debated question; indeed, a careful study of the accurate and full records they have left us makes one ponder and prompts the question: What do we know of these disorders that they did not know?"

Dr. Truman further says:

"Most earnestly would I urge upon those making a special study of this and allied disorders a thorough research and careful study of its literature. I question if any department of our art has been more carefully studied or more fully written up than have been the disorders and diseases of the tissues surrounding the teeth. Fauchard, Ricci, and other able writers and observers made of the disease of the gums and teeth a careful study. They visited the hospitals, and in conference with physicians and surgeons earnestly and zealously labored to master the same conditions that confront and baffle us today. Many writers of today, giving the results of their recent studies in this field, would probably be astonished were they to see their productions in parallel column with those of Bourdet, Jourdain, and many others who lived and labored before the present century began. When a writer expresses the opinion that this disorder is becoming increasingly frequent, that it is the outcome of modern ways of living, that it is largely more prevalent as the result of imperfectly performed dental operations, I wonder if he knows that more than a century ago it was so prevalent, so intractable to treatment, so prolific of tooth-loss, that the dentists of that day, discouraged and disheartened, labeled it *devastation of the teeth*.

"Of it Dr. H. H. Hayden, writing in 1822, has this to say: 'This disease, from the nature and extent of its

ravages, as great or more so among the opulent and rich as among the poorer classes of society, has at different times engaged the attention of some of the most skilful physicians, as well as professional dentists, in Europe; and in the course of treatment which they have pursued they have severally resorted to every means for its cure that medical skill could suggest—emollient, astringent, and detergent gargles of various kinds; astringent, tonic, and antiseptic elixirs; mercurial washes, absorbent powders, aromatic pastes, electuaries, alteratives, sedatives, venesections, vesicatories, injections, setons, issues, excision of the diseased parts, scraping the diseased bones, repeated applications of the actual and potential cautery, etc.—notwithstanding which, their efforts have proved ineffectual.'

"Some of the older writers have observed that persons subject to gout or rheumatism were seldom afflicted with this disease; on the contrary, those afflicted with the suppuration of the gums are seldom troubled with gout or rheumatism, while recent writers contend that gout, rheumatism, and pyorrhea have a common origin and are frequently associated. From the earliest mention of this disorder to the present hour, our profession has been quite unsettled regarding it, and as a natural result, much time and labor have been expended in rehabilitating discarded theories or in the effort to supplant one unsatisfactory theory by another equally at variance with observed facts. Fauchard was inclined to reject the theory that certain diseased conditions of the system were the cause of it, because he had frequently seen cases where the systemic diseases were well marked and the trouble did not exist; and also from having observed the converse of this, cases where this trouble was well marked and no disease was present; and the further observation that remedies suited to these diseases had no effect whatever upon the oral trouble. He regarded the coexistence of the two as a mere accident, and was more firmly inclined to this opinion from having frequently observed that in such cases, while the systemic trouble readily yielded to appropriate remedies, there was no corresponding improvement in the oral lesion. Systemic treatment, he was impressed, was of little avail. Precisely the same statements have been made at a very recent date, and while not universally accepted, I am impressed that Fauchard's position in this matter is substantially that of the masses of the profession at this time."

The above quotations are from a paper written in 1896. One might think that since the recent wave of modern prophylaxis has swept over the profession, Dr. Trueman had certainly changed his mind, but listen to what he says in 1908 in regard to this so-called filth disease: He says: "In reference to this matter, are we not at a standstill? Papers are being read upon it in rapid succession, the pages of our journals are full of it, but are we advancing? I show you a copy of the business card of Dr. William H. Atkinson, who therein claims to have mastered the treatment of pyorrhea about 1840, and he offers to teach how it can be done. A little later Dr. Riggs defined the pathological conditions associated with pyorrhea from his viewpoint, and he, too, successfully treated the disorder, and for some time the profession was busy vigorously chiseling at supposed necrosed alveolar borders. Now we are getting back to Dr. Atkinson's ideas, with some little changes, to

make them comport with the modern suggestion that it is a 'filth disease' whatever that may be. Is this progress? What is filth? How does it come to be in the oral cavity? Is a periodic raking it up and washing it out the best the profession can do for the patient? This brings us to a question on which the whole matter depends, namely, Is it normal for a human being in civilized life to have a filthy mouth? If it is, then the dental scavenger is legitimately on the program and to minimize the evils of this filth is the right thing to do. If it is not normal, then it is up to the profession to seek the cause back of it, the cause of its presence, and to accept this dental prophylaxis as a mere temporizing. To exalt it to a solution of the trouble is not to the credit of the profession."

A paper on this subject was read by Dr. Kirk a few months ago, in which he took the ground that it was not normal for these conditions to be present, that treatment should not be merely mechanical, and should be directed not to their presence but to the cause of their presence. It had the right ring. Getting at the real cause is today the trend of medical science; we need more of it, a great deal more of it, in the dental profession. It may be that we will find that many of these disorders of the soft tissue of the oral cavity are filth diseases, but unless the more recent research is at fault, the filth will be found to be located yards away from where dental prophylaxists have been so long pottering and in close proximity to the anus, surrounded on all sides by absorbent glands that are taking up and distributing throughout the system the toxins which are generated by a mass of putrid filth located there.

Now, I ask, Why is all this? Why have we made so little real advancement in the treatment of this dread disease as compared with the rapid strides made in the mechanics of dentistry? Why is it that so many dentists pay practically no attention to the treatment of this trouble? Why is it that the majority of dentists never notice that their patients have Riggs' disease until there are some very decided symptoms, receding of the gums, very deep pockets, or loosening of the teeth. Oftentimes these men never notice it or look for it until it has progressed to such an extent that the patients themselves call the dentist's attention to it. Why is it that as a rule, even when treatment is attempted, it is done in a half-hearted sort of way, and oftentimes only at the earnest insistence of the patient? Why is it that the treatment is usually unsatisfactory to both patient and dentist, and that the disease is very rarely controlled?

We have progressed step by step in other lines, taking here and there every little suggestion given, and working up to a more complete method, until we have reached a wonderful degree of perfection. But in the treatment of Riggs' disease we have spasmodically started up every once in a while, for several generations, have applied ourselves to it for a short while, and unconsciously drifted away into the art and mechanism of restoring lost tooth-structure.

When Dr. John M. Riggs gave to the profession his unique set of instruments and demonstrated the results that he obtained, there was a great stir among dentists; many procured a set of his instruments and began to operate, expecting the same results. The instruments soon fell into comparative disuse and the profession devoted itself to filling

teeth with gold, and Riggs' disease was as incurable as before. When Fauchard gave his views to the profession and outlined a treatment over one hundred years before Dr. Riggs' time, the history of the way in which the profession received it enthusiastically and did nothing with it is the same. This was no doubt repeated several times between the time of Fauchard and Riggs, and it has been repeated more than once within our own time. When Dr. Ingersoll advanced the sanguinary calculus theory, enthusiasm again manifested itself, and gradually died away. When Reese and Peirce came forward with the uric acid theory, a new interest was manifested, and we relapsed as usual into indifference. When Dr. George Clements showed us the hypercalcification of the cementum, we stirred a little in our sleep, but we did not even open our eyes.

Dr. Younger demonstrated to the satisfaction of many that with his ingeniously devised instruments he obtained really wonderful results, and there was another break in the calm that ruffled the waters considerably, but Dr. Younger and his accomplishments were soon drowned by the great waves of crown and bridge work and extension for prevention.

Now comes our great apostle of modern prophylaxis, Dr. D. D. Smith. And I want to take off my hat to this good man, and thank him for the good he has done to humanity. His ideas have perhaps excited more general interest and his methods have been adopted by a far greater number of dentists than have those of any other man, and, for a time at least, more good to the greatest number has been the result. But even now we find that the interest is lagging. Men have been looking for some easy way to cure Riggs' disease. Dr. Smith's idea of keeping the teeth clean seemed, at least, to promise an easy way. But practitioners are finding it not as easy as it seemed, and Dr. Smith's voice is becoming fainter and fainter amid the roar of porcelain fillings and gold inlays. It is the old story that has long repeated itself, and will ever repeat itself until conditions radically change. It has become so fixed in our minds that the disease is incurable that many of us will listen to nothing else. A man may be ever so conscientious and may actually produce good results, yet we will not believe. We indifferently try what he advocates, fail, and throw it aside. We utterly fail to grasp the fact that the man must do *something,* that he must have *some point* that is of use, that he produces a result that at least encourages *him.* This is a point to which I wish to call your attention, viz, that these men have something that in their hands produces some good results, and that if we can grasp that something and use it as they do, it will produce results for us. But if we fail to be able to use that something as he does, we must not conclude at once that this something is nothing.

I hold that our failure to advance along these lines is largely due to our failure to systematize what these men have done and to gradually work out a more complete way. Dr. Smith accomplishes wonderful results by handling the porte polisher; very few others can do the same thing. We cannot all work alike. Dr. Riggs could not have succeeded with the instruments of Dr. Younger, nor could Dr. Younger accomplish what he has done by Dr. Smith's methods. You and I could not take Dr. Smith's methods and instru-

ments and do what he has done, nor could he succeed with Riggs' or Younger's methods. Yet no one will say that because we cannot use Dr. Riggs' instruments, *he* did not accomplish results, for eye-witnesses state that the results were marvelous. He used these instruments as no one has been able to use them since. We take up one man's method and try it indifferently, fail, discard it, and take up another and another, and fail in all. At least we get such indifferent results that the disposition is to practically abandon all and confine our efforts to mechanical operations and gradually cease to put forth any effort whatever to really cure Riggs' disease.

Now, why is this? I claim that we have utterly failed to systematize information that might have been gleaned from the men who from time to time have had considerable success in dealing with this disease. We have either refused to believe that a man has actually obtained these results, or we have utterly failed to perceive just how and why he obtained these results when we ourselves met with partial or complete failure in pursuance of what we thought was his exact manner of treatment. We fail to realize that success is due to the man's peculiar talent and fitness.

Again, because we get a certain result from a certain procedure, we have been too much inclined to refuse to accord to our neighbor the fact that he also gets good results from some other procedure, and that his theory is also largely correct. The local-theory man is too much inclined to assert dogmatically that he gets a cure by local measures, and that it is a local trouble, and that the systemic-theory man is a mere theorist. The systemic-theory man is too much inclined to lay all stress on the systemic conditions, and to refuse to concede the fact that the local-theory man accomplishes as much as he really does accomplish.

Dr. Smith has advocated the local theory so satisfactorily and with such ability that the profession are accepting it, just as they accepted Dr. Peirce's constitutional theory, which is diametrically opposed to it. The golden mean lies between these theories. These men are both right and both wrong; Dr. Peirce in that he assumes that uric acid is the factor that produces the disease, while it really has no more to do with it than has malaria. Uric acid will cause Riggs' disease, but so will malaria. Dr. Smith is wrong in that he gives out the idea that pyorrhea is purely local. The infection is local, certainly, but due to systemic causes. He himself suggests that it may be caused by foul breath. Why, then, is it not reasonable to treat the constitutional causes as well as the local infection? True, the local infection may often be controlled by close application to the part, but why should we not correct, if possible, the conditions that cause the infectious breath, and so not handicap ourselves? Is this not reasonable? Is it not common sense?

And so, while holding fast to what we have found to be good, let us not fail to lend a helping hand to our neighbor in developing his ideas. If we get good results from local treatment, and our neighbor claims results from systemic treatment, let us combine, if possible, the good parts of our treatment and those of his. Again, if in systemic treatment we are using allopathic remedies, let us not assume that no results are to be obtained from the homeopathic treatment.

If some man of intelligence carries

out long and careful investigations and tells us that uric acid causes Riggs' disease, we had better think very carefully before we say that uric acid conditions are no more accountable for the local conditions than is any other systemic disorder; and we should carefully experiment before we assume that the anti-uric acid remedies do more toward curing Riggs' disease in general than an anti-malarial remedy. If some man announces that after long and careful observation he has reached the conclusion that syphilis is more far-reaching in its ultimate results than the profession dreams of, and that he is convinced that it is largely responsible for Riggs' disease, it would be well, before dismissing this as ridiculous, to look deeply and thoughtfully into the matter and to at least remember this in our treatments when all ordinary methods fail. If a careful investigator tells us that a catarrhal condition of the mucous membrane of the nose and throat is continuous in the mouth and greatly affects the pyorrheal condition and its treatment, it behooves us to think long and carefully before deciding that we will pay no attention at any time to the throat and nose while combating this disease. If some man, who has had much experience, tells us that coffee is responsible for a very large part of Riggs' disease that exists today, it would be well, before laughing him to scorn, to ask just what effect coffee has on the nervous system of many people, and to what extent it is capable of disturbing perfect metabolism; and then it is worthy of more than a passing thought to remember how many people drink coffee and how often they drink it, and to remember that coffee is usually drunk to stimulate a tired, nervous system and to keep it up at a high pitch at the very time when nature is trying to relax it.

When it is announced to us, after almost incalculable labor and research, that imperfect metabolism or malnutrition is the great causative factor of this disease, we should stand with uncovered heads before such men as Talbot and Kirk, and read, study, investigate, and think almost with reverence before we dogmatically dispose of their view with the sweeping assertion that the disease is as common among our healthy and vigorous patients as it is among those that are enfeebled and run down in health. On the other hand, it is equally dangerous to accept any one man's views *in toto*, and to be wholly satisfied therewith. If we see one man operate skilfully and produce excellent results, we are much inclined to accept not only his method of operating, but also his views as to the etiology of the disease and the pathological condition of the surrounding parts. Again, we read some strong article of an original investigator, one that seems entirely reasonable, and we are inclined to shut out everything else and to entirely accept his views, being satisfied with them. It is true that at times the profession has been so bewildered by the numberless theories advanced that we have been compelled to accept somebody's views that might appeal to us as reasonable, but the time now seems ripe for a more reasonable and comprehensive systematizing of the knowledge already at our command, and for a more direct and uniform mode of treatment.

In this paper I have no new theory to advance. I have reviewed the past history of this disease in order to make a plea for a concentrated, determined effort to change the conditions that have

led us all, as Dr. Trueman says, "to swing round in a circle"—to rid our minds as far as possible of dogmatic tendencies; and that those of us who are specially interested in this disease will with clear, untrammeled judgment concentrate our energies to bring order out of the chaos and bring about a system of treatment that is as direct, as uniform, as intelligent, and as effective as is now our system of restoring tooth-structure, or as is the system of treatment of any of the various specialties of medicine. It is my firm belief that this can be done, but it cannot be done in one day. To this end I would urge the uniting of a few men deeply interested in this object, who would earnestly, patiently, and unselfishly work to this end. Notwithstanding the discouraged tone that runs all through the article from Dr. Trueman's pen, I am convinced that we today are in a position to rapidly advance and to cease to "swing round in a circle." I believe that to accomplish this it is necessary to combine as a body for the cure of Riggs' disease. I believe that it is necessary to concentrate our energies in a powerful effort, but we will not accomplish this in a general dental association. A small body of earnest, intelligent men can combine and form the nucleus from which shall grow a large and efficient association; surely the ultimate good accomplished will be incalculable. May this society be formed, and may it be formed at an early date!

Discussion.

Dr. A. W. Patton, Tuscaloosa, Ala. I think that this is a very timely subject indeed, and one that I feel that I know very little about. On account of my bad hearing I cannot say anything except that I indorse what the essayist has said. As a young practitioner I feel that I knew nothing of pyorrhea yesterday, very little of pyorrhea today, and like the rest of us, I have to guess at what it will be tomorrow. I do think, however, that we are making progress along this line, and I believe that in the course of time we shall have pyorrhea under control. Even now we see evidences that some of the worst cases may be cured.

Dr. J. P. Gray, Nashville, Tenn. I wish to congratulate Dr. Stewart upon his paper. Although, as has been said, there is nothing particularly new in it, he has given us some good wholesome advice.

I do not agree with him that there should be another organization. We have too many now, but we might make a special section for that subject in our present body. I think that those distinguished men who are devoting their life-work to this subject should do some real research work and show what brings about the disease, in order that the profession may have something to work from. Some men are devoting a great deal of attention to this subject, and some of the operators in this field are empirical in their practice. I believe the day is fast arriving when through the opsonic treatment that is being followed in many diseases we will eventually succeed in finding some positive cure for this trouble. I know of one or two men who have obtained what they claim to be a pronounced success in this work. The mechanical part of course must be carried out along with the other treatment. I believe that pyorrhea finally becomes a constitutional disease, just as much as any other disease. I did not quite understand the essayist with regard to

malaria, but my impression is that he spoke of malaria as being connected with this disease. Is that true?

Dr. Stewart. Any disease can cause Riggs' disease.

Dr. Gray. I do not know about that. I think that by virtue of the fact that the system is reduced to a low state in the performance of its functions the trouble may be produced. I know that you will find this in a great many, and it is distinctly clear to my mind that wherever fecal matter has been absorbed by the blood, a case of pronounced so-called pyorrhea may arise. You will find then that a certain amount of absorption in the blood has taken place, and you cannot cure that or any other disease as long as this is the case. The blood of people who eat largely nitrogenous foods is absorbing this material, and you will find that this is the case in some of the most robust men who do not have proper elimination and present this disease in a pronounced form. As far as uric acid is concerned, those whom we consider authorities on this subject are convinced that uric acid has little to do with the disease. The correctness of this opinion is fully demonstrated by the chemical analysis of the urine, by which it has been found that only about five per cent. of the cases of pyorrhea present any uric acid whatever. We find in rheumatic troubles that only about five per cent. of the cases have uric acid, even in a small quantity. But we forget that the system is largely charged with an excess of acids of various kinds that accumulate in the system and which must be eliminated before a cure can be effected. I can recall, from visiting the office of Dr. Talbot, who has been making a large number of experiments and has been doing a great amount of research work along this line, that he took up the study of these pyorrhea cases and made urine examination of some four hundred patients affected with this trouble, and found that there was an excess of acid in the blood of from ten to one hundred per cent. I recall two patients belonging to a very wealthy family, a man and wife, who for some six years did not have their teeth, which were in a bad condition. These patients were put on the acid treatment and in the course of a week all the small deposits present were removed; in one patient there was absolutely no deposit at all. I watched these two cases for ten days and there was a marked improvement. The doctor tells me that he has met with great success in his treatment by the elimination of indican from the blood. I believe that the day is coming when the opsonic treatment will be used in the treatment of this disease. But we cannot cure pyorrhea, if a cause for it is present in the system, simply by the removal of the deposits. We may stay its progress for a time, but we must eliminate the cause, and the same treatment will not do for all cases. With all due deference to Dr. Smith's treatment, every dentist knows that if the teeth are kept absolutely clean the disease will not attack them locally. It is therefore absolutely necessary that the dentist should carry out this prophylatic treatment along with the systemic treatment of this disease.

Dr. J. H. Crossland, Montgomery, Ala. I very much enjoyed the able and learned paper read by Dr. Stewart, but there is one statement that I must take exception to, namely, the general idea conveyed by the paper that no noteworthy progress has been made along this line. I was in Memphis a few years ago, and Dr. Stewart was kind enough to

show me a number of cases which he treated, and the results which he obtained were marvelous, being entirely beyond what I had believed possible.

There is one thing by which I have been profoundly impressed recently in connection with this subject of Riggs' disease, and that is that there are so many men who stand in abject terror of its presence. I do not wish to be understood as claiming that I am capable of positively curing the disease in all cases, but there is a tremendous percentage of cases which can be reduced to that stage which is generally called a cure, without any very great skill or experience in that line of practice. Many dentists have the habit of examining the patients' mouths and on discovering this disease, of saying that nothing can be done for it. I do not say that the dentist should claim that every case can be cured, but he can assure the patient that he can be greatly benefited. I believe that there are hundreds of cases in which the general practitioner can obtain results that compare very favorably with the results we obtain in other lines of practice. Indeed, in many cases he can get quite as good results as the specialist does. The periodical treatment as advocated by Dr. D. D. Smith will relieve more cases of that trouble than any other treatment known to us today. I believe the general practitioner can do more good by employing this treatment than by any other method.

Dr. STEWART (closing the discussion). I agree with Dr. Crossland that the average dental practitioner can do a great deal more good than he really does by devoting more attention to prophylaxis. I did not mean to convey the idea that no advance has been made in this line of work; that was merely a quotation from Dr. Trueman to which Dr. Crossland took exception. Some advance has been made, but it is very little compared with the advance that has been made in the mechanics of dentistry. Leaving out the systemic treatment and the various later mechanical appliances, it is extremely doubtful whether any man produces any better results today than Dr. Riggs himself did forty years ago.

Dr. Gray says that we do not need another organization. I have thought on this subject more than Dr. Gray has, and I am convinced that the general dental associations will not make the progress we are looking for in Riggs' disease. My idea is that men especially interested in this line of work should unite in a new organization and devote themselves to the scientific study of this one disease. We could in that way do what Dr. Gray suggests and stimulate original research along this line. I am fully persuaded that the formation of such an organization presents to us the only hope we have of the direct work that we stand so much in need of today. I propose to stimulate the interest in this work, and unless I fail in my determination, this association shall be formed.

Dr. CHACE then presented the following report from the Executive Committee:

Your Executive Committee, to whom has been specially referred the paper of Dr. D. D. Smith on "Alveolar Pyorrhea," begs to report as follows: After having carefully considered the subject-matter of the paper, we recommend that it be not received.

(Signed) J. E. CHACE,
Temporary Chairman.

On motion the report was adopted.

The next order of business was the report of Section VIII (Appliances and

Improvements), by the chairman, Dr. Wm. Crenshaw, Atlanta, Ga., as follows:

Report on Appliances and Improvements.

The past year has brought forth a number of inventions and improvements in the dental world that are worthy of note. Principal among these is the cast inlay method, which with its various modifications promises to revolutionize in a measure some lines of practice. While primarily intended for the casting of inlays for fillings, its scope has been widened until crown and bridge work of superior construction can be made under this system with economy and accuracy. There are at least a dozen different machines for this purpose. The first and most extensive is that suggested by Dr. Taggart. This outfit involves the use of nitrous oxid to produce the oxyhydrogen flame. The work done with this machine is pronounced by its users to be perfect in every detail.

Another device which performs the same work by an entirely different principle is that known as the Jameson centrifugal. This machine in the hands of expert workers is giving excellent results. The force employed for throwing the melted gold into the matrix is obtained by a rapid rotary motion imparted to revolving arms.

Numerous other small machines, all having the press feature attached, are on the market, and each month new devices appear. We might mention here the Kenyon Compressed-Air Outfit for the same purpose. All of them, however, with the exception of the Jameson, have many features in common, but to describe them and give a detailed report of their working qualities would involve an essay upon cast inlay work, etc., which is out of the province of this report.

Among the small devices that have appeared since the last meeting we can mention: A new Adjustable Separator. Case's Abrasive Wheels. Little Giant Post Puller. Adapters for Hypodermic Syringes, so as to permit the use of a straight needle at right angles with the syringe. Trigger's Cavity Impression Trays. Translux Cement. Berylite Cement. Hood's Mat Gold. Various forms of Model Wax for use in Inlay Practice. Sterilized Paper-cloth Rolls to be used in the place of Napkins. Black's Amalgam Pluggers, Nos. 1 to 7. Improvements in Angle's Rubber Ligatures. Doriot Handpiece No. 3 and attachments. Black's Finishing Files and Knives. S. S. W. Diamond Chair. Wilson's Ampules. Drying Ovens for Inlay Work. Peritundo, for obtunding sensitive dentin, the preparation to be applied by injecting the gums immediately surrounding the affected tooth. (A special clinic on this preparation will be given at the meeting in Birmingham.)

In furniture for office equipment there have been numerous additions to the list of cabinet and work-benches, many cabinets being now provided with iron safes for the protection of the precious metals so often found in dental offices.

The new books especially pertaining to dentistry and brought out during the past year are—Gilbert's "Notes on Porcelain." Goslee's "Crown and Bridge Work." Turner's "Text-book of Prosthetic Dentistry." Ludy's "Questions and Answers." Hewitt's "Anesthesia,"

new edition. Angle's "Malocclusion," seventh edition. "Practical Dental Metallurgy," by Hodgen, new edition.

In electrics little has been added to the devices in use one year ago. Numerous sterilizers and water-heaters have been placed on the market, and the prices of some of these have been greatly reduced. The S. S. White Dental Mfg. Co. has brought out a new electric furnace combining many excellent features, and doing away with some objectionable points found in previous models.

The increase in cast inlay work has caused manufacturers to put upon the market pure gold in small ingots convenient for casting purposes.

Dr. CHACE then presented the following resolution from the Executive Committee:

The Executive Committee would recommend the passage of the following resolutions:

RESOLVED, That the Southern Branch request the National Dental Association to change the by-laws with reference to admission of members, so that anyone eligible to membership in the National Association shall be admitted without a delegate certificate; the receipt for dues for the current year from his state association shall be evidence of standing in the state association; and be it further

RESOLVED, That the Southern Branch requests the National body to further change its by-laws so that a member in arrears or suspended for non-payment of dues may be reinstated by the payment of one year's arrearage, together with the current year's dues.

Respectfully submitted,

(Signed) J. E. CHACE,
Temporary Chairman.

Motion made and carried that the above resolutions be adopted.

The meeting then adjourned until 8 o'clock P.M.

SECOND DAY—Evening Session.

The meeting was called to order Wednesday evening, May 13th, by the president, Dr. A. R. Melendy.

The first item on the program for the evening session as announced by the president was a paper by Dr. G. V. I. BROWN, Milwaukee, Wis., on "A Study of the Inter-relation Between Oral, Nasal, Dental, and Facial Deformities with a View to Greater Simplicity of, and a More General Benefit from Orthodontic Procedures."

The President announced as the next item on the program for the evening session a paper by Dr. THOMAS P. HINMAN, Atlanta, Ga., on "A Plea for the Adoption of Orthodontia in the Practice of Every Dentist," as follows:

A Plea for the Adoption of Orthodontia in the Practice of Every Dentist.

By THOMAS P. HINMAN.

Orthodontia for many years has been the *bête noire* of the majority of practitioners of dentistry. The older method of extraction, the use of rubber wedges, vulcanite plates, and other ancient paraphernalia have been relegated to the trash pile, and the adoption of real scientific and accurate methods of tooth-movement has placed orthodontia on as positive a basis as the filling of teeth. To this has been added simplicity of construction of appliances, which puts the regulation of teeth in the hands of any careful, painstaking practitioner. The first step in orthodontia should be the realization that irregularity is based on normal occlusion. When the practitioner realizes this all-important point, the diagnosis of the case becomes so simple that anyone with a little study can soon understand any irregularity. Having accomplished this, the application of remedial agents becomes much more simple.

It has remained for Dr. E. H. Angle to give us, in his most admirable book on "Malocclusions of the Teeth," 7th edition, a classification that is simple, effective, and complete. He divides all classes into three divisions according to the occlusion of the first upper and lower molars.

Class 1 is where the arches are in normal mesio-distal relation. (Fig. 1.)

Class 2, the lower arch distal to normal in its relation to the upper arch; with its subdivisions. (Fig. 2.)

Class 3, lower arch mesial to normal in its relation to the upper arch; with its subdivisions. (Fig. 3.)

Practically seventy per cent. of all cases belong to class 1. A thorough study of the case in hand before beginning the correction of an irregularity should be made by taking impressions of both the lower and upper arches and the construction of good models. Dr. Angle recommends that all such cases be taken in plaster, but the busy practitioner will find that satisfactory models may be made from impressions taken in Perfection modeling compound. I use this material practically in all cases. The reason that I wish to impress this matter of model-making so earnestly is because I have so many models sent to me for opinion and advice in which either only the upper model is sent, or if models of both arches are sent they are such poor ones that it is impossible to place them in their correct occlusal relation—therefore it is practically impossible to make a correct diagnosis and give advice.

I am somewhat eclectic in my method, not holding to any one system in regulating. In practically all cases of class 1, which represent the greater majority that come into my hands for correction, I have found that the Jackson appliance gives me most satisfactory results, but I have adopted the Angle system exclusively in classes 2 and 3. The real intent of this paper is to describe the construction and application of the Jack-

son appliance. I am asked so frequently what time it is best to begin with the correction of irregularities that I wish at this time to make myself clear on this all-important question. My universal answer to this query is to begin as soon as the teeth show irregularities, and whenever the patient will submit to wearing an appliance. It frequently happens that the lack of development of the superior arch is observed at the early age of six or seven years; in such cases the use of the Jackson appliance gives us admirable results. To be more explicit, we will suppose that a case presents itself with the upper centrals in position and the upper laterals erupting labially, having practically no room to come into the arch. If the arch be expanded at this time you will find that the laterals will come into their normal position as soon as they have room. This is also true of the inferior arch. The Jackson appliance can be worn on both the upper and the lower arch at the same time with very little discomfort. The important point to be observed, however, is the absolutely constant wearing of these appliances except when cleansing them. Failure of this appliance, if it be properly constructed, is practically always due to the fact that the patient does not observe this rule. It is very important

FIG. 1.

that the appliances remain in the mouth during meals, for if they are removed at this time the process of mastication brings the teeth back into their old position. Another advantage of this appliance is that it may be worn as a retainer in the majority of cases.

The construction of the Jackson appliance is very simple, all the instruments necessary being a clasp-bender, a wire-cutter, contouring pliers, and a soldering iron. The appliance is constructed as follows: Make accurate models of the case and with No. 36-gage 18-karat gold fit the lingual surface of

the bicuspids and first molars with plates made from this material, shaping them lingual surface. (Fig. 4.) With 20-gage platinoid wire make clasps to fit around

Fig. 2.

Fig. 3.

with the contouring pliers so that they rest against the cervical borders of these teeth but slightly stand off from the the buccal surface of the first bicuspids and the first molars, passing between the adjoining teeth at the occusal surface

and lapping over the lingual plate (Fig. 5), so as to hold the lingual plate in position during the soldering process. (Fig. 6.) The base-wire, which should be of 12 or 14-gage platinoid, is bent so as to extend from the first bicuspid to the middle of the first molar; then running at right angles along the palatal surface of the model and extending across to the opposite side, where it is bent in the same way—this wire is held in position on the model during the process of soldering by small pieces of moldine. (Fig. 6.) The base-wire and clasps are soldered together with block tin melted with the soldering iron. The second bicuspid has no clasp wire around its buccal surface, but is soldered to the base-wire at this time. The fingers or springs, which are made of 20-gage platinoid, are then bent and arranged on the model to perform their various functions, and are held in place during the process with ordinary pins stuck in the model. These pins are also used to hold the clasp wires in position before they are soldered to the lingual parts of the base-wire. Finish the appliance on the lingual side by flowing considerable block tin over its surface, so as to give the requisite strength. The appliance is then polished with pumice and is ready for the mouth.

Fig. 4.

Fig. 5.

An appliance so constructed will invariably fit the mouth perfectly. Tooth-movement is made by bending the different finger wires so as to impinge on the teeth to be moved. Before beginning the bending of these wires it is wise to lay the appliance with its occlusal surface downward on a piece of paper, and with a pencil, to make a record, outlining the appliance and the fingers, so that each time the patient presents himself it can be seen just how much tooth-movement has been made, and how much more is required. The original model of the case, with the age of the patient and the date at which the case is started, should be carefully kept and constantly referred to during the progress of the regulation.

Fig. 6.

With these simple and effective methods at hand there is no excuse for any practitioner to neglect to regulate cases that come under his observation, for there is no branch of dentistry that produces such marvelous changes in the facial expression and such beautifying of the unbeautiful as the regulation of the teeth. Besides all this, the improvement in occlusion and in the powers of mastication is so great that we cannot afford to neglect our patients in this particular. I would advise those interested in this work to secure both Angle's "Malocclusion," 7th edition, and Jackson's "Orthodontia." With a careful study of these works, and with the application of the principles and practices advocated and explained in these books, I am sure the practice of orthodontia will become a pleasure instead of a bugbear.

Discussion.

Dr. R. C. Young, Anniston, Ala. It is always an honor to discuss a paper or anything else shown by Dr. Hinman, because all that he does he does well and scientifically.

The great difficulty in the correction of irregularities is that the people who practice orthodontia do not realize the fact that teeth move just exactly in the line of the force brought to bear on them. You can move a tooth anywhere, provided you can secure sufficient anchorage.

With regard to the question of taking impressions in orthodontia work, I agree with Dr. Hinman, not that it is more difficult to take impressions with plaster of Paris, but for the reason that the patients—who are invariably children—do not like the plaster impression. A good modeling compound impression is sufficient for all orthodontia cases. Another point in taking impressions is that the ordinary impression tray is not desirable. We want a tray with a flat bottom and with a high ridge. The main object in taking impressions for orthodontia purposes is to get as much of the alveolar process as possible, because this is just as important in correcting irregularities as the teeth themselves. With regard to the methods spoken of by Dr. Hinman, it is simply marvelous what can be done with the intermaxillary anchorage. Anyone who has practiced that method and has had experience with it knows that it seems to move the teeth as if by magic. I do not agree with Dr. Hinman when he says that the making of the Jackson appliances is very simple. It has proved very difficult in my hands.

Someone asked me how to get the solder to flow, and if borax would do it. It will not. A good flux for making the solder flow can be made by dissolving zinc to saturation in hydrochloric acid and diluting the solution with about one-half pure water. This makes a very useful soldering fluid for all purposes, where soft solder is to be applied.

Another question is that of space. There are three things absolutely necessary to be considered in the practice of orthodontia—first, to get space, second, anchorage, and third, to apply force. The point of anchorage is of much more importance than the point of delivering the force. I have seen men attempt to move a canine tooth in lingual occlusion by anchorage to a bicuspid. The anchorage if not secure will move to the ship, and the ship will go on the rocks and go to wreck.

In regard to some other phases of orthodontia, I had the pleasure a few weeks

ago of reading a paper on the subject of mouth-breathing before the Alabama Medical Association. This question of adenoids, gentlemen, is one of greatest importance to the dentist, because, of all the etiological factors in malocclusion, nasal stenosis is the most prolific, not excepting even the premature extraction of teeth or even injudicious extraction. Looking into the posterior part of the mouth we find three sets of tonsils, the lingual, the faucial, and the upper tonsil, or third tonsil, and this is the one that causes all the trouble. These things were not understood until 1868, when a gentleman in Copenhagen first called attention to these growths and named them adenoids. When Pandora opened that box and released the numerous ills of humanity, there was not one so deleterious in its effect upon children as that of adenoids and nasal stenosis. It therefore behooves us to do all that we can to obviate future trouble in overcoming this condition. I have here a model of the mouth of a boy fifteen years of age, and weighing ninety-five pounds, whose mother told me that he had been taken from school because he was unable to learn. The boy had had adenoids, which had been removed last summer, but unfortunately the mischief was already done.

Adenoids and nasal stenosis may occur in infancy and in very young children. I believe that many children are treated for all sorts of ailments, while the trouble is caused simply by adenoids. As the result of this nasal stenosis the child cannot breathe through the nose, because the nose is blocked up, and as a consequence he breathes through the mouth. The mouth cannot perform this function properly, and there is a lack of proper oxygenation; the patient goes on to a state of emaciation, and the physician declares it to be the result of overwork at school. It is not, gentlemen, it is adenoids. Going through the street, you can observe such cases, that have the characteristic pinched appearance around the nose, and it is one of the dentist's duties to call the attention of the parents to these conditions. The child is not responsible for it. If you will call to mind your anatomy, you will remember that the territory occupied by the adenoids is a very narrow space and is easily closed by the growths, consequently an insufficient amount of air passes through the spaces with a subsequent lack of proper nourishment. Nature may accommodate herself to a small amount of air, the same as a man can accommodate himself to a small amount of nutritious matter which may be sufficient to keep him alive but not sufficient for development or repair.

A peculiar observation I have made is how closely the result of this nasal stenosis simulates the habit of cigarette smoking in the young. When I see a boy puffing a cigarette, I feel sorry for him, because I know that he is undergoing a general want of oxygen throughout his whole system. Each cell with its nucleus and nucleolus needs just so much oxygen to keep it going, just as the general structure needs pabulum to build it up. When one is smoking a cigarette he inhales so much smoke that there is a lack of sufficient oxygen, and as a result the tissues and the system are in a narcotic state, and when the mouth is held open, the muscles drag the mandible down and backward. The result of this is a shortening of the mandible from the lack of proper development, and we have the receding chin. I believe that in the proportion as that chin recedes, a person

will have a weak mind. The same cause that arrests the mandibular development arrests the mental. This nasal stenosis results in the lack of the proper development of the nose and face. On each side of the nose we have a maxillary sinus; these require air for their development, and where there are adenoids there is a lack of air and a lack of development.

With regard to the question of occlusion, Angle, that great master-mind in orthodontia, has selected the two first molar teeth, upper and lower, as the guide to occlusion. You can never have a perfect face when you have malocclusion. Why do we take these molars? Simply because they are invariably the teeth that come into proper position at the proper time. One but rarely sees a first molar erupting out of time. Generally speaking, they come into proper place and at the right time, when everything is developing properly. If we stop the development we immediately throw the teeth out of position. Nature has so fixed the teeth that when they close together the jaws are locked and held in the proper relation, and as soon as the teeth are out of occlusion there is a lack of this interdigitation of the cusps, and the incline of the cusps acts contrarily to the normal. Then the upper jaw is pushed forward and the lower jaw backward, with a consequent protrusion of the upper jaw and a receding chin, a deformity that is difficult if not impossible to correct, unless the initial cause be first removed.

These vegetations are so far-reaching in their injurious effect upon the child and through life that the dentist should be on the lookout for them among the little patients under his care, and insist upon their prompt removal.

Dr. J. P. Gray, Nashville, Tenn. I wish to congratulate Dr. Hinman on his paper. While we do not agree altogether, I want to say that I disagree very much indeed with the gentleman who has just spoken, and cannot allow this opportunity to pass without giving my views on this subject. I believe in the first place that mouth-breathing causes adenoids. The whole thing is brought about by an arrest of the development of the bones of the superior maxillary, the nose, and the face. You have to have room to breathe. If you close up the septum of the nose, this trouble will be brought about, usually in the first years of the child's life. The arrest of development may have taken place *in utero*, or from the first six months of extra-uterine life to the second or even eighth year. During this period the trouble occurs, and as a result we have mouth-breathing by virtue of the closing of the parts involved, and this is what Dr. Brown is trying to correct when he speaks of spreading the arch. Until we spread the arch so the patient can breathe, we may cut out the adenoids every few months, and they will come back, as a rule.

Dr. E. G. Quattlebaum, Columbia, S. C. There is one point with regard to text-books that I should like to speak of. Dr. Angle takes occlusion as the whole basis of orthodontia, and the essayist recommends both Angle's and Jackson's books on the subject of orthodontia. Dr. Angle's whole work on this subject is based on the one idea that occlusion is the basis of orthodontia. On the other hand, Dr. Jackson does not give a single model calling special attention to occlusion in his whole book. He seems to have entirely overlooked the idea of occlusion. I therefore cannot

comprehend why the essayist should recommend both books. For my needs, Angle is all-sufficient; as for Jackson, he does not seem to have any general plan running through his work. It is a description of cases which does not seem to conform with the same ideas as Angle's work, and I think that every man in this audience would profit by securing Angle's book and by reading and studying it.

Dr. HINMAN. I wish to say that no one can understand how to make Jackson's appliances by reading Angle's book, and that is the reason why I recommended Jackson's book. I think the last speaker is very much in error when he says that Dr. Jackson shows no occlusions. My recollection is that he shows many occlusions and calls attention to the use of the intermaxillary force. He showed many models at the Jamestown Exposition with his appliances in place for the proper application of this force.

I should like to call your attention to one thing: There is a young man, who has been with me for about five years, who is going to give a clinic tomorrow on the construction of the Jackson appliance, and I think it would be well for those who are interested in this work to see this clinic. There is no question that you can get rapid and very satisfactory results by the use of Jackson's appliances. Take, for instance, the case which I showed you, in which the arches were carried out into normal alignment in six weeks; if you can show me the same results from any other appliance, I would like to see it.

Dr. G. V. I. BROWN, Milwaukee, Wis. I am very glad to have the opportunity of complimenting Dr. Hinman not only on his paper, but on his manner of presentation and its purpose. If we are to derive the full benefit from this sort of work, there is no question that it must be more generally practiced. We must not simply send cases here and there to someone who has made a specialty of this work, but the general practitioner must have a thorough understanding of its principles. I look upon this subject as upon one that is going to lift the dental profession upon that plane about which we have talked a good deal at this meeting, and I believe that it is going to do so, for one particular reason if for no other. It will not be very long before those who are battling with the "great white plague" will realize that the sum and substance of all they accomplish may be put into just two or three words—more air and better air, more food and better food. That is all that the treatment of consumption amounts to, and if orthodontists cannot secure more air and better results from the food than anybody else, I do not know who could. When this subject is understood, as Dr. Hinman has advocated here tonight, by practitioners generally, there will be no doubt as to your position as benefactors of the human race.

As far as the question of adenoids is concerned, I was immensely interested in the two sides of the subject as represented here tonight. In the cases which Dr. Young so eloquently spoke about, we have had a typical train of symptoms wonderfully and perfectly described—the crowded condition with arrested maxillary development, and adenoids forming in a situation where there is not sufficient air and therefore insufficient oxygenation. Undoubtedly this is often a factor in their development, but in reply to a similar

question that was recently asked in New York, I called attention to the fact that in cleft-palate cases, which are wide open and where there is improper though not insufficient oxygenation, we almost invariably find adenoids and enlarged tonsils. These are the two sides of this question, each supported by unquestioned, though exactly opposite clinical evidence. We must therefore look beyond for some more primary principle of development, and that is what I have tried to make clear tonight—the principle which from the beginning of the individual's life produces a tendency to irregular cell development, one of the most common manifestations of which is irregular development in the nasopharynx and in the tonsils. Both previous speakers will agree that these enlarged tonsils and adenoids are the result of unhealthful conditions, and that any tendency in this direction may be a causing factor. Where there is a want of oxygenation one finds adenoids because the conditions are unhealthful, and in wide-open palates there is an unhealthful condition because the air is not properly warmed—the air strikes the mucous membrane directly, irritates it on account of it being insufficiently warmed, and produces an unhealthful condition. We have therefore hypertrophy of the mucous membrane, and such expressions of this tendency as adenoids and enlarged tonsils.

With regard to orthodontic appliances, I should like to mention that in one respect I think Dr. Jackson's appliances are in a class by themselves, as I have only recently discovered. Dr. Jackson's retention appliance is something that no one can afford to overlook, because it allows the natural movement of the teeth in their sockets. We must have more or less freedom of movement in the adjustment of the teeth during retention, if we wish to have the best results, and in that respect Dr. Jackson's appliance is very good indeed.

Dr. Hinman (closing the discussion). I have nothing further to add. I just wish to thank the gentlemen who have spoken for their very kind words, and to say that if I have been able to give by this effort any stimulus along the line of orthodontia, I shall feel that my small effort of tonight has been greatly rewarded.

The meeting then adjourned until Thursday afternoon.

THIRD DAY—Thursday, May 14th.

The meeting was called to order at 2 o'clock, Thursday afternoon, May 14th, by the president, Dr. Melendy.

The minutes of the Jamestown business meeting were read by the secretary, Dr. Frink, and approved by the society.

Election of Officers.

The election of officers resulted as follows:

President—Dr. J. E. Chace, Ocala, Fla.
First Vice-president—Dr. H. Clay Hassell, Tuscaloosa, Ala.
Second Vice-president—Dr. Wm. Wallace, Westmoreland, Columbus, Miss.
Third Vice-president—Charles Logan Gunn, Gadsden, Ala.
Treasurer—Dr. B. D. Brabson, Knoxville, Tenn.
Corresponding Secretary—Dr. W. G. Mason, Tampa, Fla.
Recording Secretary—Dr. Carroll H. Frink, Fernandina, Fla.
Executive Committee—Dr. A. J. Cottrell, Knoxville, Tenn.; Dr. C. L. Alexander, Charlotte, N. C., both for a term of three years.

A telegram of sympathy in the illness of his wife and regrets as to his absence was formulated and ordered to be sent to Dr. V. E. Turner, of Raleigh, N. C.

A vote of thanks was extended to the Alabama Dental Association, to the Local Reception Committee, to the Birmingham hotels, and to others who contributed to the success of the meeting.

A committee of three was appointed to make endeavors for a large attendance of the members of the Southern Branch and delegates from the South to the National Dental Association meeting at Boston, July 28–31, 1908, with the view of a possible steamer trip *en masse* from Savannah, Ga., or some other point.

The following were appointed on this committee: H. Clay Hassell, Tuscaloosa, Ala.; F. L. Hunt, Asheville, N. C.; W. R. Wright, Jackson, Miss.

A special vote of thanks was extended to Dr. Burton Lee Thorpe, St. Louis, Mo., for the excellent lantern entertainment and lecture on dental history.

A similar vote of thanks was extended to Dr. G. V. I. Brown of Milwaukee and to St. Vincent's Hospital of Birmingham.

The following resolution was introduced by Dr. George S. Vann, Gadsden, Ala.:

In order to make definite and effective the recommendation of our president relating to the appointment of a committee of five for the purpose of carrying out a movement which shall insure for the National meeting of 1909 the largest gathering of dentists the world has ever seen, and which recommendation was adopted upon the report of the committee to whom the President's address was referred, therefore be it

Resolved, That a committee of five be appointed by the retiring president and the president-elect for the ensuing year, and an amount not exceeding six hundred dollars be

placed at their disposal to defray the legitimate expenses of this work; and be it further

RESOLVED, That the committee have entire charge of the arrangements in planning for and carrying out this recommendation, directing them to work conjointly with the officers of the National Association.

The Secretary was on motion instructed to send the following telegram of sympathy to Dr. J. Y. Crawford, Nashville, Tenn:

The Southern Branch of the National Dental Association and the Alabama Dental Association in convention assembled are deeply cognizant of your absence from our midst and we deeply and sincerely deplore the same. We most sincerely trust that you may soon be completely recovered and that at our next meeting your splendid zeal, learning, and wisdom may enliven and strengthen the tone of our proceedings, and that your genial and manly personality may cheer us as on so many former occasions.

The President appointed the following as the Publication Committee for the ensuing year: Drs. G. S. Tignor, C. L. Alexander, G. S. Vann, and C. H. Frink, recording secretary.

Dr. J. E. Chace, Ocala, Fla., was installed as the newly-elected president, and very feelingly responded to a call for a speech, after which the session adjourned.

The association then adjourned *sine die*.

THE CLINICS.

Dr. C. L. Alexander, Charlotte, N. C. "Inlays with Moss Fiber Gold."

This clinic demonstrated Dr. Alexander's method of using and solidifying sponge gold, using that form of gold known as moss fiber. The technique as demonstrated was very simple. A piece of moss fiber gold of sufficient size to make a complete operation was detached from his stock gold and molded with the fingers to approximate the form of the cavity or the special work to be made. It was then placed to position upon the tooth and forcibly made to conform to the cavity or desired shape. The form thus procured was invested in sump, leaving only a pinhead exposure of the gold, over which the solder—22-k.—was placed and fused. The investment was made upon a small piece of paper placed upon a wire-gauze soldering-frame. Heat was applied entirely from below until the solidification was completed, thus avoiding air-pits in the finished work.

By this method the clinician casts simple or complicated inlays, also crowns, hood, and saddle abutments. He uses the same method for backing up porcelain facings, making cusps for crowns, and bridge work, and for setting Logan and other forms of porcelain crowns.

Dr. Alexander demonstrated that his method is a great time-saver as against the matrix and machine castings, and has far-reaching possibilities. Special gold instruments and investment material is being made for this class of work.

Dr. I. N. Carr, Durham, N. C. "Cast Gold Fillings."

Dr. Carr demonstrated a method of making cast gold inlays, using the Lee machine. He showed how the making of large gold fillings is simplified by the cast gold method, also how he avoids expansion and contraction in making long spans in bridge work, by first carving the dummies in wax, and reproducing them in gold by the use of the machine, putting the cast dummies back on the articulator and having to solder only the two ends to the abutments.

Dr. C. M. Barnwell, Jr., Atlanta, Ga. "Cast Gold Inlays."

If two approximo-occlusal cavities in the second bicuspid and the first molar are given, proceed to prepare them for cast gold inlays, as follows: Cut the walls well away buccally, lingually, and cervically. Follow out the fissures and

grooves in the occlusal surface and parallel or slightly flare the walls and smooth the margins. Then soften a piece of Taggart's green wax in hot water and press it into the cavities. Have the patient close his jaws and grind on the wax. This gives the correct occlusion. Trim away the surplus wax and with a thin steel strip separate the fillings. Carve up each filling to the proper contour, always carving from the tooth to the wax, and not from the wax to the tooth. Should the wax become too hard and have a tendency to crumble, flow a little hot water over it from a syringe. Chill the wax and remove it by sticking an explorer into it. Mount the wax model on a sprue-wire by heating the wire and pressing it against the model. Place it in a crucible-former and invest in a small flask. Allow it about fifteen minutes to set, then remove the crucible-former and hold it over a Bunsen burner to dry out. Remove the sprue-wire and heat up until all the wax is driven out.

Then place the investment in the machine with an ingot of gold in the crucible. Turn the blowpipe on it and use about 8 or 10 pounds pressure. When properly melted, bring the lever down, and the cast is made. Saw off the sprue, remove any warts or beads from the underside, and try the inlay in the cavity. Partially polish the inlay and set it with thin cement. Finish the polishing as soon as the cement is set.

Dr. W. R. Renalds, Salem, Va. "Hollow Cast Inlays and Crowns, Anchored to Teeth Without the Use of Pins."

As Drs. Taggart, Alexander and others have in the past so fully explained the underlying principles governing inlay work, together with the preparation of cavities, I shall have to say but little on that phase of the subject.

I had the pleasure to inspect the beautiful specimens of cast work shown by Dr. Taggart at the Jamestown Dental Convention, and witness the working of his casting machine, and it is needless to say that I became deeply interested in the method, and have since been trying to do something in the same line.

When the Taggart system was introduced I realized that the doctor had given us a good thing. I felt, however, that there was a link missing which I have endeavored to supply, and which others may accept or reject as they may deem proper.

Feeling that the method called for an excessive quantity of gold and gave only a very limited attachment to the tooth, I conceived the idea of making the pattern hollow, so that it might be reproduced in the inlay and crown, thereby reducing the quantity of gold and giving the finished work a more stable attachment to the tooth. This methed was worked out mentally before I returned home from the convention, and I proceeded at the earliest opportunity to reproduce it in practice and to verify the correctness of my theory.

The manner of procedure is as follows: After conforming the wax to the cavity with the proper contour and carving, as is the usual custom for investing, I remove the pattern and embed it in a plaster matrix, allowing the plaster to cover the entire outer surface of the pattern, leaving the cavity side exposed. As soon as the plaster sets it is im-

mersed in ice-water, and the wax is allowed to chill.

With specially devised instruments in the engine handpiece the excavation is made, but before excavating, all moisture should be removed from the wax. The matrix may be held in the hand while making the excavation, though a better method is to rest the matrix on a grooved plate slotted into a rest with a blast of cold air to maintain the chill and to blow away the chips; of this device I am not yet prepared to give an ocular demonstration.

The excavation being satisfactorily made, dip the matrix in tepid water to remove the chill from the marginal rim of the pattern; cut and break away the plaster, remove the pattern, and free it from all plaster particles; return it to the cavity and smooth the edges with burnishers to correct any distortions that might possibly have occurred in the previous manipulations. It is then removed with the sprue-pin and invested.

In investing the pattern, great care is necessary to prevent air-bubbles from forming in the cavity and spoiling the core. This may be obviated by placing investment material in the cavity with a suitable brush, and then blowing out every particle possible, so that all of the surface is covered, when it can be carefully refilled, with the assurance that all is well.

When the proper fit of the inlay has been determined and the inlay is ready for adjustment, make a counter-lock in the tooth-cavity, and when tooth and inlay are cemented together and the cement becomes hard, the result is a key dovetailed into both tooth and inlay.

In making a gold crown, the same method of procedure is followed.

By making an excavation in the stump of the tooth, a short crown may be sufficiently held by the cement key, but if the crown is a long one, pins set in canals projecting into the excavation of the crown would permit of a shallower excavation in the tooth-stump. Where a long crown is required, porcelain set on a cast base is preferable.

My method of constructing such a crown is as follows: Prepare the stump of the tooth and make a cone-shaped excavation of the desired depth to allow an easy removal of the wax base projection. Roughly shape the wax to enter the excavation in stump and crown, place one end in the stump with the crown over the opposite end and force it to proper occlusion, trim off the protruding edge of the base flange; remove, embed the wax in a plaster matrix, excavate the center of the base, and cast from the crown end, which places the investment core at the bottom of the mold.

The projecting end of the base fitting closely into the excavation in the stump will in many cases be all the anchorage necessary, yet an increased support is obtained by placing a pin or pins in the root-canals projecting into the excavation of the base.

Dr. Wm. A. Lovett, Brewton, Ala. "A Porcelain Crown Made from a Plain Rubber Tooth Backed Up with Porcelain."

The clinician disclaims originality in making crowns by this method, but does not remember to whom it should be credited.

A plain rubber tooth, having platinum pins, is ground to fit the labial aspect of the root. Platinum foil should then be burnished over the root-face, and a plati-

num pin be made to fit between the tooth-pins. The pins should then be closed together over the end of the root-pin, and held in position by a touch of sticking wax. With the platinum in position over the root, force an opening into the same with the root-pin, carrying it into position with the tooth attached, and holding it by an application of wax. Remove the whole piece including the platinum from the root-end, and invest. Porcelain of the desired shade should then be worked down into the spaces around the pins and shaped to the proper contour by repeated bakings, if necessary. Care must be exercised to avoid air-bubbles, because the porcelain promptly dries on its surface when brought into contact with the invested piece.

This method insures a correct adaptation of the crown to the tooth-root, and its originator claims for it sufficient strength for practical purposes. Personally, I have not given it a thorough test, but I am inclined to believe that it may be employed advantageously in selected cases. A slight shrinkage of the added porcelain may sometimes be noticed at the root contact point, but as this amounts to about one two-thousandth of an inch, the efficiency of the crown is not materially affected.

Dr. George W. Randall, West Blocton, Ala. "The Porcelain Crown."

This was a short, simple plea for a square base as the one which is most quickly executed, the one with which we can most nearly approach perfection, and the one which is the strongest after setting.

The root is prepared after the bulk is removed with a carborundum disk; with a medium grit stone, seven-eighths in diameter by one-eighth in thickness, the anterior portion is ground to a line below the gum margin, then the posterior portion is ground to a point where, if the face of the root be made perfectly square, the pin of the crown will be perpendicular and as nearly a right angle as possible to the face of the root and crown when placed in position.

The face of the crown is prepared by grinding the bulk with the same wheel as the root was ground with, and finishing with a carborundum disk.

This clinic was given for the benefit of young practitioners who are in doubt how to set a crown or who are afraid of a failure after having set what, if properly done, is the strongest and most beautiful crown of all.

Dr. E. G. E. Anderson, Knoxville, Tenn. "New Method of Fitting a Porcelain Crown."

The clinician demonstrated a method of mounting Logan fixed or loose-pin crowns, Davis or Richmond crowns, which does away with the band or collar and affords an attachment which is both strong and accurate and not cumbersome or bulky.

The method of procedure is as follows: Prepare the root in the manner usually employed for a porcelain crown with the canal slightly larger than the pin or post, then grind the crown with the labial side of the root and crown in approximate conjunction, grind the crown so as to almost fit the root elsewhere, then grind out a small space from the crown at the lingual side of the crown and root. Place a ball of wax on a pin

of sufficient size, press it to place and trim off the surplus wax, chill it, remove, examine and try it in again and see that it is right. Invest the wax and cast with gold. It will be found that the gold has reinforced the post and fills the holes made in the root, and the crown cannot be forced on the root except in the way you intended it to go.

Dr. Howard T. Stewart, Memphis, Tenn. "Removable Bridge Work in Cases of Riggs' Disease."

Dr. Stewart presented a very interesting system of removable bridge work, devised by him, and especially adapted for cases of Riggs' disease where a number of the teeth have been lost.

The abutments consist of removable shoulder crowns constructed somewhat as follows: The cap and pin are made as if for an ordinary Richmond crown. An extra floor is then soldered on this cap, leaving the edges extending very slightly. Twenty-two karat solder is then flowed around the band flush with this extension. This is then trimmed and polished. A solid gold "lug" of the proper height for the articulation is then made, with a slot three-fourths of its diameter. This should be a little smaller than the circumference of the cap. After being trimmed and polished, this is soldered to the top of the cap. Then a jacket is formed to fit snugly over this lug and to extend out on the remaining portion of the cap to the edge. Through the side of this jacket, two pieces of clasp metal are carried and made to fit into the slot in the lug and then waxed in position; the jacket and the clasp metal are removed together and the clasp metal is soldered to the jacket. The two pieces of clasp metal, when spread slightly, form a spring which works in the slot on the lug. Then on the jacket thus formed, the remaining portion of the crown is easily built up to the proper occlusion. We then have a removable shoulder crown, with a spring which holds it firmly in position on the lug. One advantage of this crown being made with a shoulder is that there is absolutely no irritation of the gums.

Dr. Stewart presented quite a number of bridges, showing the various phases of the work. The abutments can be made either with solid gold or with facings by changing the shape of the lug very slightly.

Also, in some cases, where there is an extremely short bite, the clinician advocates the use of a split pin working into a tube in the root and fixed in a very ingenious way into the shoulder crown, which forms an excellent attachment. One bridge he exhibited also showed a method of making a double inlay with this spring attachment for an abutment. These removable abutments seem to be especially adapted for cases where the posterior teeth are all lost. In these cases the clinician forms a removable saddle, which can be taken off and lowered from time to time, as the ridge absorbs, until the ridge be beaten down to a solid foundation.

The clinic demonstrated an exceedingly ingenious and perfect system of removable bridge work.

Dr. T. M. Allen, Tampa, Fla. "Cement Inlay Filling."

Dr. Allen demonstrated the use of Dunn's plastic stone material, an inlay cement, in making a permanent filling.

The advantages of this material are that tin foil, gold or platinum can be used for a matrix by working the material directly in the tooth, mixing the material like cement and placing it in the matrix on the tooth. It hardens very quickly, and should be shaped up properly with enamel chisels, sandpaper disks, etc., before baking. It can be baked over a Bunsen burner with a blowpipe or in a furnace, and should be carried to a dull red heat. There is no shrinkage in the baking, and it requires only one baking. The rapidity with which this inlay can be made makes it a very valuable material. Dr. Allen inserted fillings in approximal and crown cavities in a bicuspid and in a labial cavity of a central incisor.

Dr. Jos. D. Eby, Atlanta, Ga. "Orthodontia—Jackson System."

In the clinical demonstration I am about to make I shall construct an upper appliance on a model of my own mouth, and afterward place the appliance in position to test its accuracy. The object of this demonstration is to show the points in the construction, the instruments, the manipulation, etc., of the Jackson system, and incidentally to outline its many admirable qualities and to show its adaptability to the regulation of all conditions encountered.

Models of green plaster are found to be more effective, both in the making and handling of individual pieces and in the "fit" of the appliance. Models made from compound thoroughly chilled before removal from the mouth are adequate for this work.

The first step consists of a cervical preparation of the teeth to be clasped.

The linguo-cervical margins of all teeth which are to bear partial clasps are carefully outlined with a very thin knife-blade or a special instrument; the slight grooves thus formed secure for the partial clasps an attachment under the gum margin, thereby deriving full benefit from the bell shape of the lingual surfaces.

The attachment of all Jackson appliances consists of "partial clasps" and "spring clasps." The partial clasps are plates fitting the lingual surfaces of the anchor teeth, and the spring clasps consist of wire springs which clasp the teeth on the buccal surfaces, as their name implies.

The "partial clasps" are made of 18-k., No. 36 gage (standard) gold plate. The best preparation of this gold is made by Dr. Jackson. He treats one surface in such a way as to render the adhesion between the surface and the tin solder perfect, leaving the exposed surface polished.

The following is an economical method of preparing the partial clasps: Cut a strip of metal giving it the width of about two-thirds that of the lingual surfaces. Contour a piece about as long as the mesio-distal width of the respective tooth, and cut it off; then with short-jawed scissors trim it to fit the cervix and press it slightly to position. Partial clasps made in this way will not dislodge from a "green" model, yet care must be taken to not embed them into the plaster.

The next step is the making of the "spring clasps." Platinoid wire is used throughout in this appliance. Spring clasps are made of Nos. 20 or 21 gage platinoid wire bent by clasp-benders or round-nose pliers, sometimes with the additional aid of "laboratory and office" pliers.

A piece of wire averaging two inches in length is first fitted to the double curve

of the bucco-cervical margin, the ends are bent toward the occlusal surface at the mesial and distal angles, over the interproximal morsal grooves and on to the lingual surface over the partial clasp, both ends well overlapping to gain a strong attachment in the solder. At this stage of the process it is best to fasten all the clasps together with a very small amount of solder, eliminating any danger of slight displacement.

A "base wire" of No. 12, 13, or 14 gage platinoid wire is bent across the palatal curvature with the ends made to rest along the lingual length of the clasps on either side, to be embedded in tin solder, connecting the two lateral halves.

FIG. 1.

There are several different shapes into which the base wire can be bent, indicated by the particular movement it has to perform.

FIG. 2.

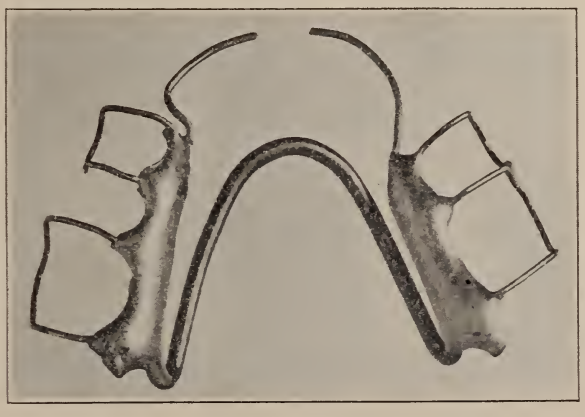

Fig. 1 shows the most frequently used shape in upper appliances, running straight across the palate in the back and bent almost at right angles at the point of entering the body of the solder.

Fig. 2 shows a very admirable shape

for use in molar as well as bicuspid expansion—indicated in developmental work. Comparatively few cases need molar expansion. The style shown in Fig. 1, producing bicuspid expansion, is less extensive, more stable, and more easily manipulated in most cases.

Fig. 3.

Fig. 4.

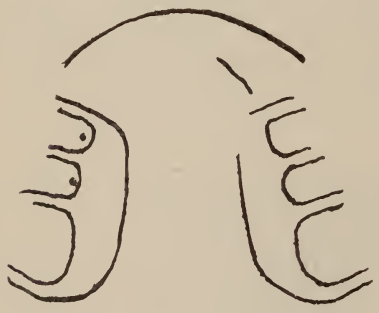

Fig. 3 shows the shape of the base wire used in lower appliances. This shape does not interfere with the tongue, and must not be so low as to impinge upon the frenum or press against the tissues. It affords both bicuspid and molar expansion.

The foregoing description concerns the body of the appliance. To this body wire springs of any shape can be attached, and applied to any surface or surfaces against which pressure is to be exerted.

The halves of the body or anchor portion may be described as "arms," and the spring extensions as "fingers." All fingers must have a strong attachment in the solder. After they are fitted to place they may be held there during the process of soldering by pressing moldine over the exposed ends.

After the various parts have been assembled with the attachment ends of all wires resting in the lingual region of the posterior teeth, the final soldering is made.

As a solder, chemically pure tin is preferred to any lead-tin combination, because it is slower in oxidizing and is non-irritating in the saliva medium.

Pure zinc chlorid is used as a flux, and is applied on a camel's-hair pencil.

A one-pound soldering iron is the best size, both for handling and for the suitably long retention of heat.

The flux should be kept in a large-mouthed vessel so that the iron can be dipped into it after each heating to keep it well tinned and unoxidized. Solder can be picked up with it and transferred to the appliance.

Just enough solder should be used to round the surface into a smooth and not too bulky shape.

The tin should be rendered so smooth with the iron that after a very small amount of disking it may be polished.

The palatal surface of the solder should be disked smooth so that it will

not press or rest too closely upon the tissue.

The entire construction of the average appliance requires about one hour.

The knack of accurate wire-bending and soldering, which is the time-saving feature, will be acquired by experience.

The use of a "chart" reduces adjustment to exactness and enables the operator to see just how much is being accomplished. For this purpose, lay the appliance with its face downward on a sheet of paper or on a card, and with a long, sharp-pointed pencil trace its outline upon the paper. (Fig. 4.) Then make a dot or dots at the point any part is to be tightened to, and after bending place the appliance back for comparison.

Make fresh tracings of tightened parts before each adjustment and dot off the amount to be tightened. This not only facilitates the tightening, but gives a complete record of the case.

One very important feature in the anchorage of a Jackson appliance is the use of collars in cases of very short or relatively short teeth. Make collars, or what are commonly known as Magill bands, for the teeth which are to bear spring clasps. With 18-k. solder form a rounded prominence on the lingual surfaces. Remove the bands in an impression, run a model, and proceed to make the clasps. Before soldering, coat the bands with a film of whiting or very thin plaster to keep them from being engaged by the solder. By cementing these bands on the teeth the appliance will have the rounded prominence and cervical constriction to snap over.

Jackson appliances are practically painless after the primary soreness has passed away. This is due to their spring pressure, which begins with a minimum and increases to a maximum of force.

If a patient lives at a distance, the case can be well undertaken, even if adjustments can be made but once a month. Weekly adjustments for resident or easily accessible patients work sufficiently rapidly in the majority of cases.

This system is applicable for bilateral and unilateral expansion, upper or lower, for mesial and distal traction of the posterior as well as the anterior teeth, for forced eruption, depression, torsion, for buccal, lingual, and labial movement, for intermaxillary equalization, for bilateral or unilateral opening of the bite.

Root-movement, which is being done more and more by scientific orthodontists, comes in for its full share in the Jackson system.

Jackson appliances can be gold-plated, two or three baths being applied to insure thorough covering.

Old orthodontists, who used to "straighten teeth," who passed through the rubber plate and jackscrew age, who were perplexed by almost insurmountable difficulties in overcoming conditions and employing successful appliances, can appreciate the Jackson system; and when those who have adopted this system undertake a difficult case, it is with a certain feeling of satisfaction in their hearts and minds which tells them that "It can be done."

Dr. A. J. Cottrell, Knoxville, Tenn. "Bicuspid Restorations."

The necessity for crowning the bicuspid arises perhaps in three-fourths of the cases from the splitting away of either the inner or outer cusp. Owing to the smallness of these roots and the desire to maintain the esthetic as far as possible, it is quite a problem to decide as to the best means of restoration. It is a fact that when one of these walls splits away the remaining one is usually rea-

sonably strong. This demonstration proposes to take advantage of this strength, and by means of an inlay with a pin in the root-canal, to restore the tooth in a way more esthetic and stronger than afforded by any crown yet suggested. The end of the remaining cusp is beveled or slightly scooped out in such a way that the finished piece accurately and firmly engages it. This, with the pin in the root-canal, gives all the strength needed.

If the outer wall be gone, an ordinary facing is fitted, and the whole is finished by soldering or casting. In practical cases these are best made by burnishing a platinum matrix, fitting the pin, soldering and reinforcing, and then taking the impression and bite. Place it on the articulator and adjust from that.

Dr. G. R. Lovelace, Waycross, Ga. "A Quick Method of Replacing Teeth on Vulcanite Plates."

This clinic consisted of a method of remounting teeth on vulcanite plates by the use of Melotte's metal. A dovetail is prepared with as large a doll-head at each end as the vulcanite will admit, and dressed with a large inverted cone bur. Adjust the tooth as desired and place the plaster over the labial and grinding edges. Remove all traces of wax with alcohol or chloroform, dry out, flow the melted metal in, and finish as you would vulcanite. The clinician does not recommend this method in all cases, especially not in thin plates.

Dr. Alice M. Steeves, Boston, Mass. "Mandible Fractured at the Symphysis."

Fractures may occur at almost any point of the jaw, if sufficient force be applied to produce the fracture. Many authorities contend that we never get a fracture at the symphysis, and I have been unable to find any literature on this subject. One case, however, was reported from a New York hospital, and the following case came under my observation:

Fr. G., Scandinavian, aged twelve years, was referred to me by Dr. F. Coolidge. Family history: Tuberculous. Clinical history: Two months previous to applying for treatment the patient was playing on a sidewalk, fell, and struck the tip of her chin on a small stone. Contusion followed, with soreness of the lower central incisors; after a few days the swelling increased, with the formation of pus, pointing on the chin. This was lanced by Dr. Coolidge, a copious discharge of pus following. After a few days the right incisor began to tighten in its socket, but the left remained loose, and pus continued to drain from the opening on the chin. When the patient came under my care, after a careful examination, I found that the probe passed up through a sinus until it came in contact with the root of the left central.

Treatment. The left central was extracted. Crepitus was distinct. Antiseptic precautions were taken, and the carious bone was removed from the sinus with a large engine bur; a packing of iodoform gauze was used, and removed after two days, when a cap splint was cemented to the teeth from first molar to first molar. The wound was dressed with a solution of sulfuric acid every two days for two weeks. At the expiration of two weeks the discharge had ceased and the sinus was completely closed. Two weeks later the splint was removed and the patient discharged.